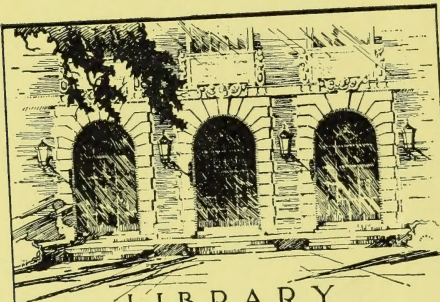






LIBRARY
OF THE
UNIVERSITY
OF ILLINOIS

570.5
BIR
v.9-10

JUL 26 1948



T.D.



Digitized by the Internet Archive
in 2014

63009
JAN 4
LIBRARY OF THE
MUSEUM OF COMPARATIVE ZOOLOGY
HARVARD UNIVERSITY

BIRDS and NATURE

IN NATURAL COLORS

A MONTHLY SERIAL

FORTY ILLUSTRATIONS BY COLOR PHOTOGRAPHY

A GUIDE IN THE STUDY OF NATURE

TWO VOLUMES EACH YEAR

VOLUME IX

JANUARY, 1901, TO MAY, 1901

EDITED BY WILLIAM KERR HIGLEY

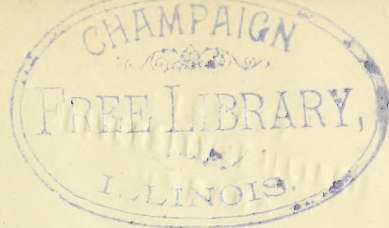
CHICAGO
A. W. MUMFORD, PUBLISHER
203 Michigan Ave.

1901

RECEIVED
1353-1.9

COPYRIGHT, 1901, BY
A. W. MUMFORD

570.5
BIR
v. 9-10



BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IX

JANUARY, 1901.

No. 1

THE OLD YEAR.

Ring out, wild bells, to the wild sky,
The flying cloud, the frosty light:
The year is dying in the night;
Ring out, wild bells, and let him die.

Ring out the old, ring in the new,
Ring, happy bells, across the snow:
The year is going, let him go;
Ring out the false, ring in the true.

Ring out the grief that saps the mind,
For those that here we see no more;
Ring out the feud of rich and poor,
Ring in redress to all mankind.

Ring out false pride in place and blood,
The civic slander and the spite;
Ring in the love of truth and right,
Ring in the common love of good.

Ring out old shapes of foul disease,
Ring out the narrowing lust of gold;
Ring out the thousand wars of old,
Ring in the thousand years of peace.

Ring in the valiant man and free,
The larger heart, the kindlier hand;
Ring out the darkness of the land,
Ring in the Christ that is to be.

—Alfred Tennyson.

6407

THE WHITE-WINGED CROSSBILL.

(*Loxia leucoptera*.)

The Crossbills, together with the finches, the sparrows, the grosbeaks, the redpolls, the goldfinches, the towhees, the cardinals, the longspurs, and the buntlings, belong to that large family of perching birds called the Fringillidae, from the Latin word *Fringilla*, meaning a finch.

Mr. Chapman tells us, in his "Birds of Eastern North America," that "this, the largest family of birds, contains some five hundred and fifty species, which are represented in all parts of the world, except the Australian region. Its members present a wide diversity of form and habit, but generally agree in possessing stout, conical bills, which are admirably adapted to crush seeds. They are thus chief among seed-eaters, and for this reason are not so migratory as insect-eating species." Many of the birds most highly prized for the cage and as songsters are representatives of this family and many of the species are greatly admired for their beautiful coloring. The White-Winged Crossbill is a native of the northern part of North America, migrating southward into the United States during the winter months. Its technical name, *Loxia leucoptera*, is most appropriate and descriptive. The generic name *Loxia* is derived from the Greek *loxos*, meaning crosswise or slanting, and the specific name *leucoptera* is from two Greek words, meaning white and wing, and has reference to the white tips of the feathers of the wings. The common name, Crossbill, or, as the bird is sometimes called, Crossbeak, describes the peculiar structure of the bill which marks them as perhaps the most peculiar of our song birds. The bill is quite deeply cut at the base and compressed near the tips of the two parts, which are quite abruptly bent, one upward and the other downward, so that the points cross at an angle of about forty-five degrees. This characteristic gives this bird a parrot-like appearance. The similarity is heightened by the fact that these hook-like bills are used by the birds to assist in climbing from branch to branch.

The Crossbills are even parrot-like in captivity. Dr. Ridgway, in the "Ornithology of Illinois," writes as follows regarding the habits of a pair: "They were very tame, and were exceedingly interesting little pets. Their movements in the cage were like those of caged parrots in every respect, except that they were far more easy and rapid. They clung to the sides and upper wires of the cage with their feet, hung down from them, and seemed to enjoy the practice of walking with their head downward. They were in full song, and both the male and female were quite good singers. Their songs were irregular and varied, but sweet and musical. They ate almost every kind of food, but were especially eager for slices of raw apple. Although while they lived they were continually bickering over their food, yet when the female was accidentally choked by a bit of egg shell her mate was inconsolable, ceased to sing, refused his food, and died of grief in a very few days."

Their peculiar bills are especially fitted for obtaining their food, which consists to a great extent of the seeds of cone-bearing trees, such as the pine, the hemlock and the spruce. The ornithologist Wilson says: "On first glancing at the bill of this extraordinary bird one is apt to pronounce it deformed and monstrous; but, on attentively observing the use to which it is applied by the owner and the dexterity with which he detaches the seeds of the pine-tree from the cone and from the husks that inclose them, we are obliged to confess on this, as on many other occasions where we have judged too hastily of the operations of nature, that no other conformation could have been so excellently adapted to the purpose; and that its deviation from the common form, instead of being a defect or monstrosity as the celebrated French naturalist insinuates, is a striking proof of the wisdom of the great Creator."

As an accidental malformation this structure of the bill has been noted among other birds, and, it is said, with some fre-



WHITE-WINGED CROSSBILL.
(*Loxia leucoptera*.)
About $\frac{3}{4}$ Life-size.

UNIVERSITY OF ILLINOIS
URBANA

quency among the crows. A mediaeval legend gives as the cause for this conformation of the bill and the red color of the plumage that it was acquired "in recognition of the pity it bestowed on the suffering Savior at the Crucifixion."

Probably due to the nature of their food, which can usually be procured in any season, these birds are apparently not under the control of the usual laws that govern migration, but wander about in a seemingly aimless manner and are not influenced to any great extent by the changing seasons. They do not seem to be a constant inhabitant of any given locality for any length of time, but appear and disappear as if constantly dissatisfied with their surroundings.

The two sexes vary in color, the body of the male being a dull carmine-red, which is brighter on the rump, and that of the female is brownish, tinged with olive-green and with **brownish yellow on the rump**. The young males are similar in color to the females, but pass through a changeable plumage while maturing.

The Crossbill usually builds its nest in a cone-bearing tree and does not always choose the most inconspicuous locality. The nest is generally constructed of rather coarse twigs and strips of birch or cedar bark and lichens. This is lined with hair, the softer fibers of bark, fine rootlets, grass and feathers. The whole nest is saucer-shaped and about four inches in diameter, outside measurement, by one and one-half in depth. Authorities tell us that the eggs are usually three in number. In color they are a pale blue, nearly spotless at the smaller end, but at the larger end marked with irregular streaks or dots of lavender or reddish-brown. The eggs are small, about eight-tenths of an inch long by nearly six-tenths in diameter.

On account of their vagrant habits, Dr. Brehm was wont to call them the "Gypsies" among birds. While seeking food or flying from place to place, they continually utter a plaintive note and their song is soft and sweet.

THE LEGEND OF THE CROSSBILL.

On the cross the dying Saviour
Heavenward lifts his eyelids calm,
Feels, but scarcely feels, a trembling
In his pierced and bleeding palm.

And by all the world forsaken,
Sees he how with zealous care
At the ruthless nail of iron
A little bird is striving there.

Stained with blood and never tiring,
With its beak it doth not cease,
From the cross 'twould free the Saviour,
Its Creator's Son release.

And the Saviour speaks in mildness:
"Blest be thou of all the good!
Bear, as token of this moment,
Marks of blood and holy rood!"

And that bird is called the Crossbill;
Covered all with blood so clear,
In the groves of pine it singeth
Songs, like legends, strange to hear.

—From the German of Julius Mosen, Henry Wadsworth Longfellow.

THE STUDY OF BACTERIA.

The bacteriologist is working in a wonderland fully as remote to the average mind as that ever occupied by the astronomer or psychologist; and yet it is as real to him as though he were walking through a forest and noting the different kinds of trees. Such popular doubts as have been held regarding bacteriology and even the existence of bacteria are no longer justified. The evidence is too overwhelming not to be accepted by anyone who has sufficient interest to investigate. The methods used in bacteriologic studies are to-day giving us information fully as concise as that obtained by the general botanist in the study of higher plants. Indeed, the phenomena of bacterial activities and the chemistry of the products of growth of many species of bacteria have already received attention not equaled in the study of some of our most useful plants.

Bacteria are plants; not because of any absolute characteristic that separates them from animals, but because comparative study shows that they are more like plants than animals. They are single-celled organisms and each individual has the prime factors of life, assimilation, growth and reproduction. Each bacterium is an independent cell and although the cells in some species remain attached to one another, giving rise to characteristic groupings, they are mostly detached and free individuals. Bacteria can increase in numbers to a remarkable extent when favorable conditions exist. The mother-cell simply splits into two daughter-cells and these form a generation of four cells, while later generations, consisting of perhaps one million cells, can in fifteen or twenty minutes produce two million bacteria. But conditions must be favorable for this active growth, ample food stuffs, free from other bacteria, together with moisture and reasonable warmth are most essential. There are many circumstances constantly at work to prevent an overgrowth of bacteria; exhaustion of food supply, antagonism of species and fresh air with sunshine, are the most important. Bacteria

are present everywhere in greater or less numbers, except within the bodies of healthy, growing plants and animals. It is for this reason that bacteria become so active and multiply with great rapidity when once established in the tissue fluids of larger organisms, either before or after they have died. Vital activities during health prevent the entrance of bacteria into our bodies. There are, however, times when the association of different species of bacteria and also the association of bacteria with higher plants is of mutual advantage. The association of decomposition and pathogenic bacteria frequently makes it possible for the latter to infect an animal, when alone it perhaps would not take place. Again, the growth of certain bacteria within the root-structure of plants greatly improves their functional activity. The leguminous plants are enabled to assimilate much larger quantities of nitrogen when associated with bacteria than when growing alone. No such mutually advantageous relationships are known to exist between bacteria and animals; the tendencies are rather destructive, leading to the infectious diseases. The general biologic function of the bacteria is very important and in a general way the need of their existence can be much better appreciated than that of many living beings. Decomposition may be stated as being their chief functional activity. Decomposition stands before life; without it the progress of the generations would terminate. The gradual and ever rapid disappearance of the substance of vegetable and animal bodies after death makes room for growing life. With an absence of decomposition the bodies of plants and animals would collect on the earth and cover it so deeply with organic matter that plants in particular would be entirely unable to obtain requisite nourishment. Higher plants having chlorophyll are able to feed on inorganic material, while bacteria require organic matter to sustain life. Bacterial food is then derived from the higher forms of life, while these higher forms feed on the end products of bacterial decomposition,

with the addition of salts from the earth. An evolutionary query might then arise as to the early conditions in the history of organic life on the earth. It is certainly a fertile field for the theorist. Accepting the general rule that simplicity of structure indicates priority, what then was the food supply of the primordial bacterium before the advent of higher plants to supply requisite organic matter? We can hardly believe that there was already in existence sufficient ammonia-bearing compounds of suitable quality to sustain these lowest organisms until evolutionary conditions added organisms having the capacity of collecting nitrogen and carbon from purely inorganic sources. These general facts, as we now see them, would apparently strengthen the thought that different kinds of organisms became extant at the same time.

The methods used in bacteriologic study are based on a few very distinct principles. Successful cultivation of bacteria depends upon a knowledge of sterilization, preparation of culture media and isolation of species. It is in fact miniature gardening. A rod of platinum wire is the trowel and this is kept clean and free from undesirable organisms by heating it red hot in the gas flame. With it bacteria are lifted from tube or plate. The culture media required are mostly beef-tea and gelatine mixtures and are prepared with extreme care as to their composition and reaction. The decomposition of the culture medium is prevented by keeping it in test tubes or flasks plugged with cotton and sterilized by boiling. By means of the cotton plug the air passing in and out of the tube is filtered and the bacteria floating in the air are caught in the cotton and cannot get into the tube. It also prevents bacteria from the culture getting out of the tube and spreading infectious material. Each test tube represents a little greenhouse, but one that is free from all life; it is sterile when ready for use. To the media or culture soils in the tubes the bacteria are transplanted with the platinum rod, and active growth is obtained by placing the tubes in a suitable temperature. Such a growth of bacteria in a test tube can contain many millions of bacteria, while the resulting

appearance of growth is due to the heaping up of the individuals. To the naked eye the cells are invisible, but the mass is recognized in the same way that one would know a field of wheat in the distance without being able to see each separate plant. Species of bacteria are separated by distributing a few organisms throughout a fluid and then planting upon solid media. The individual cells then grow in place and produce colonies. These are separate and distinct to the eye and each contains bacteria, all of the same kind. From colonies transplantations to tube cultures are made, and the species is propagated on different media. The observations from such growths, together with the microscopical study and sometimes inoculation experiments on animals are the data by which the species is recognized. Microscopic methods, although somewhat complicated have been so far developed that some species of bacteria can be as promptly recognized under the microscope as an acquaintance met upon the street.

Bacteriology is now being studied and investigated as a field of research in hundreds of laboratories, and in every university in Europe and America. Bacteriology has added as much to man's wealth and happiness as any of the applied sciences. All the methods of preservation of food depend upon bacteriological principles, while modern sanitary science is based on the recognition of the cause of infectious diseases. The presence of specific bacteria in the secretions or tissues of man and animals is now such a certainty for many diseases that the work of making bacteriologic diagnoses is in itself an extensive vocation. Within the next few years every city in America will have a diagnosis laboratory for infectious diseases. We can safely predict that the trained bacteriologist will be called upon to stand between each sick person or animal and the community to direct measures that will prevent infection of others. Hygienists are learning more every day as to the exact way in which disease bacteria pass from person to person, and the reasons for the occurrence of diseases. They have learned that the accidental and unusual circumstance is least important,

but that there is a regular train of cause and effect, and in the knowledge of how to break this chain is the key to the proper control of an epidemic. Veterinary medicine has been able to obtain benefits from bacteriology much beyond those already so important to human medicine. This is so because of the persistent prejudice opposed to bacteriology in medicine, while the veterinarian has been allowed to treat his patients practically as the experiment animals are treated in the laboratory.

Bacteriologists are frequently meeting demands made of their science that are beyond its present stage of progress. It is frequently forgotten that this is biology

whose deductions are always subject to the variation of growing things, and not chemistry or mathematics, with their definite determinations and strict limitations. Bacteriology is now an established science, and it is as competent to render service in due proportion to its development and with the same integrity as any biological subject. There are now many known facts in bacteriology that cannot be made useful because intermediate steps in their study have not been learned. It will require long series of experiments in some cases, but when added to the present usefulness of bacteriology the results may be expected to satisfy the most severe critics.

Adolph Gehrmann.

THE YELLOW-BREASTED FLYCATCHER.

"Come here! come here! come here!

My Philip dear, come here! come here!
Philip, my dear! Philip, Philip, my dear!"

Poor mournful Mrs. Flycatcher,
With ample breast of dainty buff,
Now don't you think you've called your mate,—
To say the very least—enough?

I'm sorry for you, plaintive one;
I would be glad to make him fly
From his long tarrying place to you,
If that would stop your weary cry.

Can't you decide to give him up?
All over town you've called his name;
I heard you calling this week, last,
The week before you called the same.

Perhaps some boy with "twenty-two"
Has shot him for his sister's hat.
Go! search the churches through and through;
If he's not there, accuse the cat.

—Carrie B. Sanborn.

LIBRARY
UNIVERSITY OF ILLINOIS
CHAMPAIGN



THE TOWNSEND'S WARBLER.

(*Dendroica townsendi*.)

Dr. Robert Ridgway, in the Ornithology of Illinois, uses the following words in speaking of that family of birds called the American Warblers (Mniotilidae), "No group of birds more deserves the epithet of pretty than the Warblers; Tanagers are splendid; Humming-birds are refulgent; other kinds are brilliant, gaudy or magnificent, but Warblers alone are pretty in the proper and full sense of that term."

As they are full of nervous activity, and are "eminently migratory birds," they seem to flit rather than fly through the United States as they pass northward in the spring to their breeding places, and southward in the fall to their winter homes among the luxuriant forests and plantations of the tropics. All the species are purely American, and as they fly from one extreme to the other of their migratory range they remain but a few days in any intermediate locality. Time seems to be an important matter with them. It would seem as if every moment of daylight was used in the gathering of food and the night hours in continuing their journey.

The American Warblers include more than one hundred species grouped in about twenty genera. Of these species nearly three-fourths are represented in North America at least as summer visitors, the remaining species frequenting only the tropics. Though woodland birds they exhibit many and widely separated modes of life, some of the species preferring only aquatic regions, while others seek drier soils. Some make their

homes in shrubby places, while others are seldom found except in forests. As their food is practically confined to insects, they frequent our lawns and orchards during their migrations, when they fly in companies which may include several species. Mr. Chapman, in his Handbook of Birds of Eastern North America, says, "Some species flit actively from branch to branch, taking their prey from the more exposed parts of the twigs and leaves; others are gleaners, and carefully explore the under surfaces of leaves or crevices in the bark; while several, like Flycatchers, capture a large part of their food on the wing."

The Townsend's Warbler is a native of Western North America, especially near the Pacific coast. Its range extends from Sitka on the north to Central America on the south, where it appears during the winter. In its migration it wanders as far east as Colorado. It breeds from the southern border of the United States northward, nesting in regions of cone-bearing trees. It is said that the nest of this Warbler is usually placed at a considerable height, though at times as low as from five to fifteen feet from the ground. The nest is built of strips of fibrous bark, twigs, long grasses and wool, compactly woven together. This is lined with hair, vegetable down and feathers.

The eggs are described as buffy white, speckled and spotted with reddish brown and lilac-gray, about three-fifths of an inch in length by about one-half of an inch in diameter.

THE STORY OF SOME BLACK BUGS.

We were going to visit Aunt Bessie, and John and I like few things better than that. To begin with, she lives in the country, and there is always so much to do in the way of fun that the days never seem half long enough.

Then, besides, Aunt Bessie knows everything, and can tell such famous stories. So when she asked us one morning to go to the pond with her and see something interesting, you may be sure we were not slow in following her.

The rushes grew thickly along the sides, but the water was clear, and we could plainly see the black bugs she pointed out to us crawling, slowly and clumsily, over the muddy bottom.

"Those things!" said John, not a little disgusted. "I don't think they are much. Are they tadpoles?"

"Tadpoles!" I echoed. "Why, whoever saw tadpoles with six legs and no tail?"

"The absence of a tail is very convincing," laughed Aunt Bessie. "They are certainly not tadpoles. Now watch them closely, please, and tell me all about them."

"They are abominably ugly. That is one thing," broke in John. "They look black, and have six legs. But how funny their skin is. More like a crust, or lots of crusts laid one on the other. They are about the stupidest things I ever saw. They seem to do nothing but crawl over that mud and—Hello! they aren't so stupid, after all. Did you see that fellow snatch a poor fly and gobble him up quicker than you could say Jack Robinson? And there's another taken a mosquito just as quick. I'll take back what I said about the slow business. But really, Auntie, do you think them very interesting?"

"I'll ask you that question when you have learned something more about them," was her answer. "Tell me now what you think of that Dragon fly darting over the water?"

"Oh, he is a beauty," we answered in a breath. "But please let us hear something about those things down there."

"Not to-day, boys. I wish you to see

something for yourselves first. Watch here for a few days and your patience will be rewarded, I promise you. Then I will have a story to tell you."

I knew that Auntie never spoke without reason, so John and I kept a close watch on those bugs. For two days nothing happened. The old things just crawled over the mud or ate flies and mosquitoes, as usual.

But the third day one big fellow decided to try something new. It was nothing less than to creep up the stem of one of the rushes. I suppose it was hard work, for he took a long time to get to the surface of the water. Here he stopped a while and then seemed to make up his mind to go further. Soon he was quite out of the water and could breathe all the air and sunshine he wished. I believe he did not like it very well. He seemed so restless and uneasy. I was expecting to see him go back, when I heard John cry out:

"Look! oh, do look!"

I did look, and could scarcely believe my eyes.

His skin (the bug's, I mean), was actually cracking right down the back, just as though the air and sunshine had dried it too much.

Poor fellow, he seemed in great trouble about it. Then, to make matters worse, a part of his coat broke off at the top and slipped down over his eyes, so that he could not see. After a moment, however, it dropped further, quite under the place where his chin would have been, had he had a chin.

"Oh! he is getting a new face. A prettier one, too, I am glad to say."

It seemed as if John was always first to notice things, for it was just as he said; as the old face slipped away a new one came in its place.

I guess that by this time that old bug was as much astonished as we were. He was wriggling about in a very strange fashion, and at last quite wriggled himself out of his old shell. Then we saw two pairs of wings, which must have been folded away in little cases by his side, begin to open like fans. Next, he stretched

his legs, and it was easy to see that they were longer and more beautiful than those he had had before.

Then, before we could admire his slender, graceful body, or fully realize the wonderful change that had occurred in him, he darted away before our astonished eyes, not a black bug, but a beautiful Dragon fly.

"Hurrah!" we both shouted. The next second we were rushing at top speed to tell Auntie all about it; just as though she had not known all along what was going to happen.

She listened and then told us what we did not know.

How months before the mother Dragon-fly had dropped her tiny eggs in the water, where they hatched out the black

bugs, which were so unlike their mother that she did not know them for her children, and had no word to say to them during the long hours she spent in skimming over the water where they lived.

These bugs were content at first to live in the mud. But soon came the longing for sun and air. And then followed the wonderful transformation from an ugly black bug to the beautiful dragon-fly.

If you will go beside some pond in the spring or early summer, and find among the water grasses such a bug as I have described, and will then watch long enough you will see just what John and I saw. Afterwards I am sure you will agree with us that it is very wonderful indeed.

Louise Jamison.

THE SOLITARY SANDPIPER.

He is a curious little chap, the Solitary Snipe, and we used to call him Tip-up. Hedelights to "see-saw" and "teeter" down a clay bank, with a tiny "peep-po," "peep-po," just before he pokes in his long, slender bill for food.

He is very tough, and possesses as many lives as the proverbial cat. I have taken many a shot at him—fine sand-shot at that—and from a gun with a record for scattering, and I never succeeded in knocking over but one Tip-up while on a hunt for taxidermy specimens. I failed to secure even this one, though he flopped over in the water and floated down upon the surface of the shallows toward where I stood, knee-deep awaiting his coming. He was as dead as any bird should have been after such a peppering; yes, he was my prize at last, or so I thought as I reached out my hand to lift his limp-looking little body from the water. He was only playing possum after all. With a whirl of his wings and a shrill "peep-po," "peep-po," he darted away and disappeared up stream and out of sight beyond the alders. To add to my disappointment a red-headed woodpecker began to pound out a tantalizing tune upon the limb of a dead hemlock. No sand-shot could reach that fellow, desire him as much as I might.

Then a bold kingfisher, with a shrill, saucy scream, darted down before me, grabbed a dace and sailed to a branch opposite to enjoy his feast, well knowing, the rascal! that I had an unloaded gun and had fired my last shell. How he knew this I am not able to say, but he did. Wiser fellows in bird lore than I may be able to explain this. I cannot.

The Solitary Sandpiper is well named. He is always at home wherever found, and always travels alone, be it upon the shelving rock-banks of a river or the clay-banks of a rural stream. He possesses, after a fashion, the gift of the chameleon and can moderately change the color of his coat, or feathers, rather. When he "teeters" along a blue clay bank he looks blue, and when he "see-saws" along brown or gray rocks he looks gray or brown, as the case may be.

The city boy who spends his vacation in the rural parts and fishes for dace, red-fins or sunfish, knows the Solitary Sandpiper. To the country boy he is an old acquaintance, for he has taken many a shot, with stone or stick, at the spry little Tip-up, who never fails to escape scot free to "peep-po," "peep-po" at his sweet content.

H. S. Keller.

THE KNOT OR ROBIN SNIPE.

(*Tringa canutus.*)

The Knot or Robin Snipe is a bird of several names, as it is also called the Red-breasted Ash-colored Sandpiper, the Gray-back and the Gray Snipe. It is quite cosmopolitan, breeding in the far north of both hemispheres, but in winter migrating southward and wintering in the climate of the southern United States and Central America. The Knot belongs to the Snipe family (Scolopacidae), which includes one hundred or more species, about forty-five of which are inhabitants of North America. Nearly all the species breed in the higher latitudes of the northern hemisphere. These birds frequent the shores of large bodies of water and are seldom observed far from their vicinity. Their bills are long and are used in seeking food in the soft mud of the shore.

The Knot visits the great lakes during its migrations and is frequently observed at that time. Its food, which consists of the smaller crustaceans and shells, can be as readily obtained on the shores of these

lakes as on those of the ocean, which it also follows.

Dr. Ridgway tells us that "Adult specimens vary individually in the relative extent of the black, gray and reddish colors on the upper parts; gray usually predominates in the spring, the black in mid-summer. Sometimes there is no rufous whatever on the upper surface. The cinnamon color of the lower parts also varies in intensity."

Little is known of the nest and eggs of the Knot owing to its retiring habits at the nesting time and the fact that it breeds in the region of the Arctic Circle, so little frequented by man. One authentic report, that of Lieutenant A. W. Greely, describes a single egg that he succeeded in obtaining near Fort Conger while commanding an expedition to Lady Franklin Sound. This egg was a little more than an inch in length and about one inch in diameter. Its color was a "light pea-green, closely spotted with brown in small specks about the size of a pinhead."

VIOLA BLANDA.

(Sweet White Violet.)

Serene the thrush's song, all undisturbed,
Its rows of pearls, a marvel of completeness,
Then the soft drip of falling tears I heard,
Poor weeping bird, who envied so thy sweetness!

Nelly Hart Woodworth.



KNOT OR ROBIN SNIPE.
(*Tringa canutus*.)
About $\frac{3}{4}$ Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

THE AUTOBIOGRAPHY OF A BIRD.

My name is Dewey, and no bird was ever prouder of his name. I know if Admiral Dewey could see me he would feel proud of his namesake, as I am said to be an unusually handsome, intelligent bird. I have been laughing in my wings for many months, hearing people say what kind of a bird I am. Some say I am an oriole; some a male, others a female; another a meadowlark; another not a meadowlark, but some kind of lark. One thing they agree upon, that I go on a lark from early morn till "Dewey eve." I am said to have a little of the bluejay, and points like dozens of birds. When I was about six weeks old I was quite large and fluffy, but very much of a baby, for I knew nothing about feeding myself. My tail was long, olive on top, yellow underneath; wings black, with cream color on the edges—on the lower feathers just a line, on the upper ones quite a little wider, at the top short yellow feathers, making lovely little scallops; head and back olive-brown; rump more on the yellow; throat and breast light yellow, with a tinge of blue under the wings, and belly only tinted. As I grew older I kept changing, and now at nine months old my breast is light-orange, belly light-yellow, head and back deeper olive, rump deeper yellow. I broke my tail all off in the fall, and when it came in, the upper feathers were black, with yellow a quarter of an inch at the rump; under ones yellow and black. On my head are almost invisible stripes of black, on my neck pretty broken wavy ones. My eyes are large and bright, my bill everyone says is the handsomest they have ever seen, very long and pointed as a needle. Underneath ivory white, on top black, with a white star at the head. The admiration of all are my legs and claws, as

I keep them so clean, and they are a beautiful blue, just the shade of malachite. I am seven inches long, and for the last month have been getting black spots over my eyes and on my throat. Now what kind of a bird am I?

One June afternoon I thought I was old enough to take a walk by myself, so off I started, without asking permission of my father or mother. All went well for awhile, and I was having a delightful time, seeing many new strange things. Then all at once I began to feel very tired and hungry, and thought I would go home, but which way to go I knew not. I went this way and that and peeped as loud as ever I could, calling "Mother! mother!" but no answer came. Finally I sat down, tucked my head under my wing and went to sleep. The next thing I knew something was coming down over me and I was held very tight. I screamed, pecked, and tried my best to get away. Then someone said very gently: "Don't be afraid, little birdie; I am not going to harm you, but send you to a lady who loves little birds, and will take good care of you." I was dreadfully frightened, but I did not make another peep. We went a long way. Then I heard the little boy say: "Charlotte, will you please take this bird to Miss Bascom, for she was so kind to me when I was sick?" I changed hands, and off we went. Soon I heard some one calling out: "There comes Charlotte with a bird." Then another voice said: "I wonder if it is another sparrow;" but when she saw me she exclaimed, "What a perfect beauty!" took me in her hand and I knew at once I had found a good friend and new mother. Bread and milk were ordered. Of course, I did not know what bread and milk were, but I was so hungry I could have swal-

lowed dirt or stones, so there was no trouble about my taking it, and I wished all birds could have such delicious food. I was taken up-stairs to my new home, where everything was in pink and green and looked so fresh I thought I was back in the clover field. My new mother (for that is what I mean to call her) took me up to what she called a cage and said: "Tricksey and Cervera, I want to introduce you to your new brother." Tricksey charmed me at once, for he was like a ray of sunshine in his dress of gold, but when I looked at Cervera I laughed right out in his face. It was very rude, but I know if any of you had been in my place you would have done the same thing. Of all the ugly specimens of a bird I had ever seen he was the very worst. He was Tricksey's size, but only had his baby feathers and one tail feather. He was dirt color, had big staring eyes, and such a bill, almost as large as his head, which was perfectly flat. He looked so common and ill-bred that I wondered how dainty Tricksey ever sat beside him. I was too sleepy to ask any questions and was soon fast asleep on my new mother's finger; then was put into a nice little basket filled with cotton. The next day Tricksey was very kind to me, but Cervera was cross and pecked me every time he got a chance. Tricksey said: "I have tried to be kind to that old Spaniard, Cervera, but I do not like him and will not have him snuggle close to me nights, so I fight him until he gets into the swing. If you will sleep in the cage you may put your wings close to mine, for you are so pretty and clean." When bedtime came my new mother said I was too large for the basket, and I might try sleeping in the cage, so she put me in and made Cervera get up into the swing. Just as Tricksey and I were going to sleep Cervera began swinging with all his might, and would reach down, peck us on the head and pull our feathers out. When he was caught he was taken out and made to sleep in the basket. In the morning we were all let out on the floor, and it was amusing to see Cervera mimic everything Tricksey did. If Tricksey took a drink Cervera did, and would follow everywhere he went.

About that time I saw coming into

the room a large, striped thing, with shining, green eyes, and my heart beat so fast I could hardly breathe. Tricksey whispered in my ear: "You need not be at all afraid; that is only Taffy, the cat, and we are the best of friends. Taffy jumped into my new mother's lap, and we three stood on the table and ate bread and milk together. The first time I was left in the room alone I looked around to see what would be nice to play with. First I went over to the dressing table, carried two large cuff-buttons and put them into my drinking cup, another pair I put on the floor of the cage with two large coral hairpins, two shell pins, and some studs. I stuck all the pins on anything I could pick up and threw them on the floor; turned over a basket which was filled with ribbon and lace; some I left on the floor, and with the rest I trimmed the cage. When I heard my new mother coming I began to tremble. She stood speechless for a moment, then said: "You rogue of a bird; how shall I punish you?" Then took me in her hand and kissed me, and I knew the future was clear, and I could have all the fun I wanted. Tricksey had the asthma very bad, and sometimes a little whisky on some sugar would relieve him. It was funny to see that bad Cervera manoeuvre to get Tricksey off the perch so he could eat the sugar and whisky. Tricksey grew worse instead of better, and one morning my new mother was wakened early by his hard breathing. She took him off from his perch and found his claws ice-cold, and he was so weak he could hardly hold on. He lay in her hand a moment, then threw back his pretty head and all was over. We were all heart-broken and shed many tears, for we were powerless to bring back to life that little bird we loved so dearly. I really felt sorry for that horrid Cervera. He missed Tricksey, and for days seemed to be looking for him. One evening he went out the window, and we never saw him again.

I am very fond of sweet apples and generally whenever I want anything that is down-stairs I go and get it. I love grapes better than any other fruit. When I want one I hop back and forth on the back parlor table, then on top of a high back chair and tease until one is given to

me. I like best to have my new mother hold a grape in her right hand while I perch on her left and suck all the rich, sweet juice next the skin out first; then I take the grape over on the table on a paper and knock it until all the seeds come out before I eat it. I like bananas, too, and go to the fruit dish and open one myself. Every morning I perch on the plate or finger-bowl and eat my orange.

We usually have our orange in our room, and sometimes I get so impatient I fly over to the bed, back to the orange, and beg my new mother to get up. I always take a drink out of the finger bowl and often said to myself, "What a fine bathtub this would make." When fall came I began going to bed at 5 o'clock, and at 7 was awakened and taken out to dessert. One night I became tired of waiting and went out into the dining-room very quietly, and the first thing I spied was a finger-bowl, so thought that was just the time for a bath. In I went. They heard the splashing and looked up to see everything as well as myself soaking wet. Of course they thought it very cunning, but after I did it for three nights I was told two baths a day were too much for me. I made up my mind if I could not take a bath in the finger-bowl at night, I would in the morning and, as I refused to go near my old bathtub, the bowl was given me for my own. There was a bowl of Wandering Jew on the dining-table, and several times I took a bath in the center. All said I made a beautiful picture, but when they found I was tearing the vine all to pieces it was not so pretty and many lectures were given to me, but I heeded them not, and if taken away I would walk (for I can walk as well as hop) all over the table on the ends of my toes and look every way but towards the bowl; then, when no one was looking, grab a piece and take it up on top of a picture. One day I trimmed all of the pictures, and there was none left in the bowl, so I had to look up some other mischief.

When I go out to dinner I have my own little table cloth and plate put by my new mother's. I usually take a little of everything; chicken and cranberry jelly is very good. Sometimes I do not behave very well, for I go tiptoeing across the

table to my grandmother's plate, hop on the edge, and see if she has anything I like. When dinner was ready to be served I went over on the sideboard, made holes in all the butter balls, then took some mashed potato and boiled onion and put them to cool in a big hole I had made in an apple. Few people know that birds are ever sick at their stomachs. I had been in the habit of eating a little shaved hickorynut that was put in a half shell and kept in a dish on the back parlor table. When I came down stairs I usually took a taste, and it seemed to agree with me. For a change I ate a little chestnut, and soon began to feel bad, so went off by myself and tried to go to sleep. When my new mother saw me she said she knew I was not well, for I never acted that way in the daytime. She put me in my cage, and sat down beside me. I would close my eyes and open my bill, and she thought I was dying until I opened my bill very wide and out came the chestnut in a lump a half inch long and a quarter wide.

My mother's writing desk is a favorite place of mine. I get into drawers, pigeon holes and ink; pictures and all sorts of small things I throw on the floor. Once I stole ever so many dimes and pennies. I can lift a silver dollar and often carry a coffee-spoon all about the room, so you see I have a very strong bill. If anything is lost all say "Dewey must have taken it." One day my new mother looked until she was tired for her thimble. When she asked me for it, I pretended I did not hear, but as she was going into the dining-room I dropped it down on her head from the top of the portiere. I often perch on a basket on top of the book case in the writing room. When I saw a new white veil beside me I went to work and made ten of the prettiest eyelet holes you can imagine, right in front; some were round and some star-shaped. As I grew older I said, "I will not sleep in my cage." For a few nights I insisted upon sleeping on the brass rod at the head of the bed, then changed to the top of the curtain. I have a piece of soft flannel over some cotton put on the ledge and on the wall, so I will not take cold. If it is very cold I get behind the fringe of the curtain, so no one can see me. If

warm I turn around so my tail hangs over the outside. When my new mother comes in I open my eyes, make a bow, and, if not too sleepy, come down and sit on her hand. I never chirp or peep, and when I hide and hear "Dewey," Dewey," I do not answer but fly down on my new mother's head, shoulder or hand. Taffy gets so angry at me. I know he often feels like killing me. I wake up early mornings, and take my exercise by flying back and forth from a picture on one side of the room to the head of the bed. When Taffy is on the foot of the bed I fly very low, almost touching him with my wings, and say, "You lazy cat, why don't you wake up and hear the little birds sing to God Almighty; why don't you wake up?" I soon hear words that are not used in polite society, and next see the end of his tail disappearing around the corner of the door. Before I go to sleep at night I exercise again. One afternoon Taffy was trying to take a nap in a chair in the back parlor. I kept flying over him, making a whizzing sound with my wings. When he could endure it no longer he went into the writing-room and sat down by his mother. I went in to take a luncheon on the table. Taffy stood up on his hind legs, reached out a velvet paw, and gave me such a slap I fell upon the floor. I was not hurt in the least, flew up on a picture and shook with laughter at the punishment and scolding Mr. Taffy was getting. He said very naughty words, scratched and bit, but he was conquered at last, and has behaved like a gentleman ever since. The first time I saw the snow I was wild with delight, flew to the window and tried to catch the pretty white flakes. But when I heard the sleigh bells they struck terror to my heart, for I thought a whole army of cats was coming, as all I knew about bells are Taffy's. Not long ago

my new mother was very ill and had to send for a strange physician, who knew nothing about me. When I heard him coming upstairs I hid behind the curtain and watched him fix a white powder in a paper. When he laid it on the table I swooped down, grabbed it and took it into my cage. After that I was kept busy, as my grandmother was ill for many weeks. I would carry off all the sleeping powders; one day I put them behind the bed, for I thought they would not taste so badly, and do just as much good.

It did not take more than a minute to get down there when I heard the doctor come in, for I had to see that the medicine was mixed all right. It was great fun peering into the tiny little bottles in his case. I would stand on the ends of my toes and crane my neck to watch him drop the medicine into the tumblers. The other day some Christmas roses were brought in. They looked so tempting I took several bites, and the next day took some more. I felt a little queer, and kept opening my bill. My new mother thought I had something in my throat and gave me some water. The next afternoon she found me on the floor panting, took me to an open window, gave me wine and the attack seemed to pass. We went up to our room, and apparently I was as well as ever when she went down to dinner. After she had gone another attack came on and I am too weak to write any more, and can only warn little birds never to taste of a Christmas rose, as they are said to be deadly poison.

When I went to my room late in the evening no little birdie peeped over the curtain to greet me. I looked on the floor, and there lay my darling Dewey, stiff and cold.

Caroline Crowninshield Bascom.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



AMERICAN HAWK OWL.
(*Surnia ulula caparoca*.)
1/7 Life-size.

THE AMERICAN HAWK OWL.

(*Surnia ulula caparoch.*)

The typical form of this owl (*Surnia ulula*) is a native of Scandinavia and Northern Russia, and incidentally is a visitor to Western Alaska. We are told by Mr. L. M. Turner, who was stationed by the United States Signal Service in Alaska from 1874 to 1881, that the natives assert that this form is "a resident, and breeds in the vicinity of St. Michaels; also that it is a coast bird, i. e., not going far into the interior, and that it can live a long time in winter without food, as it remains for days in the protection of the holes about the tangled roots of the willow and alder patches." Its true breeding range, however, is the northern portion of the Eastern hemisphere. It is somewhat larger and lighter in color than the American Hawk Owl.

The bird of our illustration, the American Hawk Owl, is simply a geographical variety of the Old World form, and is a native of northern North America, from Alaska to Newfoundland. This is its usual breeding range, though it migrates in winter to the northern border of the United States, and is an occasional visitor, during severe winters, as far south as Maine and Idaho. It is much more common in the northern portion of its range.

Unlike the other owls, as we usually understand their habits, it may be considered as strictly diurnal, seeking its prey, to a great extent at least, during daylight, usually during the early morning or evening hours. Its principal food consists of the various species of rodents, insects and small birds. Its southward migration is caused by that of its food species, especially that of the lemmings.

It is a tame bird and may be said to know no fear. We are told by Dr. A. K. Fisher that "specimens have been known to return to the same perch after being shot at two or three times. It is a courageous bird, and will defend its nest against all intruders. A male once dashed at Dr. Dall and knocked off his hat as he was climbing to the nest; other similar accounts show that the courage displayed

on this occasion was not an individual freak, but a common trait of the species."

Not alone in its diurnal habits is it like the hawks, but it also resembles some of them in selecting the dead branch of a tall tree in some slightly locality from which to watch for its prey. From this position it will swoop down hawk-like. Like the hawks its flight is swift and yet noiseless, a characteristic which is common to all the owls.

As a rule its note, which is a sharp, shrill cry, is only sounded when flying.

As a nesting site, hollow trees are more frequently chosen. However, nests built of twigs and lined with grass are not infrequent. These are usually placed on the tops of stumps or among the branches of dense cone-bearing trees. The number of eggs varies from three to seven, and are frequently laid long before the ice and snow have disappeared. "The eggs vary from oval to oblong oval in shape, are pure white in color, and somewhat glossy, the shell is smooth and fine-grained." Incubation begins as soon as the first egg is laid, and both sexes participate in this duty, and occasionally both are found on the nest at the same time. At the nesting season the courage of both sexes is very marked. The male will fight with its talons, and even when wounded will still defend itself. We are told by Mr. Gentry that "calmly and silently it maintains its ground, or springs from a short distance on its foe. So, bravely it dies, without thought of glory and without a chance of fame; for of its kind there are no cowards."

This bird, like the other species of owls, though possibly not to so great an extent because of its diurnal habits, is looked upon by the Indian tribes as a bird of ill omen and by some tribes all owls are called "death birds." As a whole, the hawk owls are perhaps more useful to man than any other birds that are not used as food. They cause but little trouble in the poultry yard and are of incalculable value to the farmer because of the large number of small rodents that they destroy.

A BIRD CALENDAR BY THE POETS.

January.

This is not the month of singing birds.
"Silently overhead the hen-hawk sails
With watchful, measuring eye, and for
his quarry waits."

—Lowell

February.

Sometimes a flock of strange birds descends upon us from the north—the cross-bills. There is an old tradition that the red upon their breast was caused by the blood of our Saviour, as they sought to free Him with their bills from the cross.

"And that bird is called the Crossbill,
Covered all with blood so dear,
In the groves of pine it singeth
Songs, like legends, strange to hear."

—Longfellow.

March.

No birds are more closely associated with early spring than the swallows.

"Gallant and gay in their doublets grey,
All at a flash like the darting of flame,
Chattering Arabic, African, Indian—

Certain of springtime, the swallows came.

Doublets of grey silk and surcoats of purple,

Ruffs of russet round each little throat,
Wearing such garb, they had crossed the waters,

Mariners sailing with never a boat."

—Sir Edwin Arnold.

April.

"Winged lute that we call a Bluebird,
You blend in a silver strain,

The sound of the laughing waters,
The sound of spring's sweet rain,

"The voice of the wind, the sunshine
And fragrance of blossoming things.

Ah, you are a poem of April
That God endowed with wings."

May.

This is the month of the Bobolinks.

"Merrily, merrily, there they hie;
Now they rise and now they fly;
They cross and turn and in and out,
And down the middle and wheel about,
With 'Phew, shew, Wadolincoln; listen to
me Bobolincoln!'

Happy's the wooing that's speedily doing,

That's merry and over with bloom of the clover,

Bobolincoln, Wadolincoln, Winterseebee,
follow me."

June.

"Then sings the Robin, he who wears
A sunset memory on his breast,
Pouring his vesper hymns and prayers
To the red shrine of the West."

July.

The full tide of song is on the ebb, but you still hear in the shadowy woods the silvery notes of—

"The wise Thrush, who sings his song
twice over,

Lest you should think he never could recapture

That first fine careless rapture."

—Browning.

August.

The humming-bird.

"When the mild gold stars flower out,
As the summer gloaming goes,
A dim shape quivers about
Some sweet rich heart of a rose."

"Then you, by thoughts of it stirred,
Still dreamily question them,
'Is it a gem, half bird,
Or is it a bird, half gem?'"

—Edgar Fawcett.

September.

There is something wistful in the notes of the birds preparing to depart. In the woods we see—

"A little bird in suit
 Of sombre olive, soft and brown,
 With greenish gold its vest is fringed,
 Its tiny cap is ebon-tinged,
 With ivory pale its wings are barred,
 And its dark eyes are tender starred.
 'Dear bird,' I said, 'what is thy name?'
 And thrice the mournful answer came,
 So faint and far and yet so near—
 'Pewee! Pewee! Pewee!'"

—Trowbridge.

October.

This brown month surely belong to the
 sparrows.

"Close beside my garden gate
 Hops the sparrow, light, sedate."

* * * "There he seems to peek and
 peer,

And to twitter, too, and tilt
 The bare branches in between
 With a fond, familiar mien."

—Lathrop.

November.

In cold weather the little gray Chicka-
 dee cheers us with his "tiny voice"—
 "Gay and polite, a cheerful cry,
 Chick-chickadedee! Saucy note,
 Out of sound heart and merry throat!
 This scrap of valor, just for play,
 Fronts the north wind with waistcoat
 gray."

—Emerson.

December.

The sleep of the earth has begun under
 the white, thick snow. The Owl is
 abroad by night—

"A flitting shape of fluffy down
 In the shadow of the woods,
 'Tu-wit! tu-whoo!' I wish I knew;

Tell me the riddle, I beg—
 Whether the egg was before the Owl
 Or the Owl before the egg?"

Arranged by Ella F. Mosby.

So when the night falls and the dogs do howl,
 Sing ho! for the reign of the horned owl.

We know not alway

Who are kings by day,

But the king of the night is the bold brown owl.

—Barry Cornwall.

THE OYSTER AND ITS RELATIVES.

Of all the grand divisions of the Animal Kingdom, the subkingdom Mollusca is probably the least known to the ordinary observer, and if one were asked to enumerate as many different kinds of "shell fish" as he could, it is probable that not over six or eight different varieties would be named. The majority of people think of a clam, oyster, mussel, snail or Nautilus and their molluscan vocabulary ends with these names. And yet this group of animals is second only to the insects in number of different species, beauty of coloration and interest of habitat. They may be found everywhere, in salt and fresh water, in our forests and fields, our ponds, brooks and rivers; in the valleys and on the mountain tops, and even in the waters of the frozen north, while in the warm waters of the tropics they flourish in uncounted millions. In size they range from the little sea-snails hidden in the eel grass along the shore, with tiny shells scarcely an eighth of an inch in length, to the giant squid, which measures forty feet or more from the tip of its tail to the end of its long arms; and they range from the tide-washed beach to the abyssal depths of the ocean. It is to these lowly creatures that I would draw the reader's attention.

In nearly all the species of the Mollusca the animal is protected by a hard shell, made of carbonate of lime, which is covered with a horny epidermis to protect the limy shell from being dissolved by the acids in the water. This shell is generally capable of containing the entire animal, thus affording, in most cases, adequate protection for the soft body. Those animals not provided with a shell, as is the case with the land slugs, are capable of covering themselves with a sort of mucus which encysts and protects them from both extreme heat and cold.

The lowest branch of Mollusca is known as class Pelecypoda, which comprises all of the different kinds of clams, mussels, quahaugs, etc., in which the body is protected by two hard, calcareous shells placed, generally, opposite each other and connected on the upper margin by a ligament, and the two valves work back and forth in teeth and sockets, making a kind of hinge. A set of stout adductor muscles keep the two shells or valves together and allow them to open and close at the will of the animal. The majority of clams live in the mud in a horizontal position, the anterior end being buried and the posterior end, containing the siphons which draw in and expel the water, being out of the mud, in the water. The clam progresses by pushing forward its strong, muscular foot, getting a firm hold of the mud and then drawing the shell after it. Some pelecypods, as the oyster, live attached to some object on the bottom of the water, as a stone, piece of wood or piling of an old wharf, and are not able to travel from place to place as are the true clams, examples of the latter being fresh water mussels and the marine quahaug or round clam.

Some bivalves also attach themselves by a byssus composed of a number of silk-like threads, which anchor their shells to stones, sticks, and other foreign objects. In one group (genus *Pinna*) found in the Mediterranean Sea, this byssus is so fine and silky that the Italians weave it with silk and make caps, gloves and other articles of wearing apparel.

Another wonderful and interesting arrangement for the comfort of the animal is its breathing organs or branchiae. These are two or four in number, and are made up of numerous small chambers, covered with little whip-like organs or



FROM COL. CH. ACAD. SCIENCES.

WATER SHELLS.

COPYRIGHT 1901, BY
A. W. MUMFORD, CHICAGO

381

Sunrise Shell (*Tellina radiata*)
 Cockle (*Cardium isocardia*)
 Mussel (*Mytilus edulis*)
 Fresh Water Clam (*Unio luteolus*)

Spiny Oyster (*Spondylus princeps*)

Pearl Oyster (*Margaritiphora radiata*)
 Scallop (*Pecten dislocatus*)
 Oyster (*Ostrea lacerans*)
 Spiny Venus (*Cytheria lupinaria*)

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

cilia, which keep up a constant motion, creating currents of water, bring thousands of minute organisms to the clam to serve as food. These little organisms, many of them microscopic, are caught upon the surfaces of the gills, rolled into little masses, and passed into the animal's mouth. Besides being food-gatherers, the gills serve to keep up a circulation by which fresh water is constantly brought in to purify and aerate the blood and also to expel the waste products. There is no head in this class, and the mouth is an oval slit surrounded by four lips or palpi, and leads almost directly into the stomach.

The currents of water spoken of above are controlled and directed in several different ways. In attached forms, and those living above the surface of the mud, like the oyster, mussel and scallop, the soft mantle which lines the shell is divided, forming a slit nearly the whole diameter of the shell, and the water is allowed to circulate freely through the open edges of the shells. But in those animals which burrow in the mud, as the common little neck clam, fresh water clam and quahaug, this mantle is closed and prolonged posteriorly into one double or two single siphons or tubes, one being fringed with little finger-like cilia and drawing in the water by their motion, and the other expelling the water after it has circulated through the animal.

One of the most attractive families of bivalve shells is the Veneridae, or venus shells, in which the shelly skeleton is ornamented by many bright colors, the patterns occurring in spots, dashes, zigzag lines and rays. Some varieties, as the spiny venus (*Cytheria lupinaria*) have the posterior end of the shell provided with long, sharp, curved spines, and the shell is also frilled in a beautiful manner. The common quahaug (round or hard-shelled clam), which is esteemed an article of diet on the Atlantic coast, and also to some extent in the interior, is a prominent member of this family. The Veneridae comprise some five hundred species, found throughout the world, and ranging from the shore between tides to several hundred fathoms in depth.

The family Cardiidae, the heart-shells or cockles, comprise some of the largest

and most attractive of mollusks. The name *Cardium*, signifying a heart, is given them because of the close resemblance to that organ when a shell is viewed from the anterior end. These animals live in sandy or muddy bays, and generally congregate by thousands. In England, the edible cockle (*Cardium edule*) is considered quite a delicacy and thousands are used for this purpose. In our own country they are not generally eaten, except by the poor in Florida and in some places along the Gulf of Mexico, but the waters of Florida furnish some very handsome species, among them the *Cardium isocardia* figured on our plate, and the large *Cardium magnum*, which grows to a length of five inches and whose shell is ornamented by beautiful color-patterns of brown and yellow. The foot of the *Cardium* is very peculiar, being shaped like a sickle, which enables the animal to pull itself along at a lively gait. A California cockle (*Liocardium elatum*) grows to a diameter of seven inches and would furnish a meal for several people.

In the family Tridacnidae size seems to have reached its limit. *Tridacna gigas*, found in the Indian Ocean, grows to a length of nearly six feet and weighs upwards of eight hundred pounds. Tryon records that a pair of these shells, weighing five hundred pounds, and two feet in diameter, are used as benetiers in the church of St. Sulpice, Paris. In some parts of the Indian Ocean, where pearl and sponge-fishing are carried on, this clam (known as the giant clam), is a source of great danger to the divers, many losing their lives by being caught between the great valves of the shell, by either hands or feet. Many times a diver has amputated his fingers, hand or foot, and thus saved his life at the expense of one or more of these members.

The Tellinas (family Tellinidae) number among its five hundred or more species some very beautiful and interesting animals. They live for the most part buried in sand or sandy mud and are found throughout the entire world. Our common *Tellina radiata*, familiarly called sunshell, is found in Florida and the West Indies, and a typical valve looks not unlike the horizon at sunrise, the brilliant rays of

color spreading in different directions from a common center. At Newport, Rhode Island, the writer has gathered many thousand specimens of a beautiful little Tellen (*Tellina tenera*), whose shell measures scarcely half an inch in diameter and is tinted a lovely pink or pinkish white. The siphons of this family are very long and are separated, the upper one being half or three-quarters as long as the lower one, and the foot is rather long and pointed, admirably adapted for burrowing. The long siphons enable the animal to bury itself to quite a depth beneath the surface of the sand.

Closely related to the Tellinidae is the Psammobiidae, a characteristic form of which (*Psammobia rubroradiata*) is thus spoken of by Prof. Josiah Keep, in his interesting little book, "West Coast Shells:" "But I wanted to see more of him, so I took a large jar, filled it half full of beach sand, added as much sea-water as it would hold, and plunged my prize into the same. He rested quietly for a few minutes, and then began to open his shell and cautiously put out his two siphons. Soon afterward, from between the edges of his shells, came his big, white, spade-shaped foot. He drove it down into the sand, curved it a little to one side, gave a vigorous pull, and lo! his shell followed, though just why I could not clearly understand. Though the jar was large he reached the bottom before his shell was wholly covered with sand, and had to content himself with a half-above-ground tenement."

"Next morning his siphons were stretched out some six inches in length. * * * I never thought before that there was any particular beauty to the siphons of a clam, but for this red-lined one my opinions quickly changed. Imagine two tubes made of the finest pink and white silk, stretched over delicate hoops arranged at regular intervals; then think of them as endowed with life, and waving with a graceful motion through the water, and you will have a faint idea of their exquisite texture and elegant appearance."

To those readers who live in the West, away from the ocean, the Unio, or fresh-water mussel, is more or less familiar. What child in Chicago has not played on

the sands of Lake Michigan and scooped up the little grains with the broken half of a clam shell? Or who, wading in the muddy water of Lake Calumet, has not wondered what the curious little hollow, fringed objects were which protruded from the surface of the mud? These latter were the siphons of the clam and if you were to dig under them a little way you would find the beautiful green-rayed shell of a river mussel. These are no less interesting than the marine shells already described and in beauty of ornamentation they frequently excel many of their salt-water relatives. Such excrescences as knobs, spines and rib-like undulations are common, while the colors of the interior range from pure silvery white through orange, pink and salmon to dark purple, and the rich, pearly iridescence rivals that of any of the marine shells. In many parts of the West mussels are collected by men in search of pearls, which are generally of an inferior quality, and thousands of shells are used annually in the manufacture of pearl buttons.

One of the most familiar objects to the seaside visitor is the huge banks of sea-mussels (*Mytilus*) which line the shore at low water. The shells are generally dark-colored, our common mussel (*Mytilus edulis*) being frequently jet black, and are more or less wedge-shaped in form. They attach themselves to mud banks and shore vegetation by a strong byssus made up of stout, more or less silky threads. The mussels are of great value economically, thousands of bushels of the edible mussel (*Mytilus edulis*) being consumed annually in Europe. They are also used as bait, and millions of the mussels are thus used every year. Although considered a delicacy in parts of Great Britain and Europe, it has not yet been adopted as an article of diet in this country, the clam and quahaug taking its place.

The family Aviculidae, comprising the wing-shells or pearl oysters, is of great interest, both scientifically and economically. At the present time there are a little over one hundred species living, but the family has been known from early geological times and over a thousand species have been found in the rocks. The pearl-oyster (*Melleagrina margaritifera*) is the most important member of

this family, furnishing as it does the beautiful pearls of commerce. These animals are found at Madagascar, Ceylon and other parts of the Indian Ocean, several hundred tons being imported into Europe annually. These pearls are formed by some irritating substance, as a grain of sand or some parasite, getting in between the shell and the animal, or lodging in some soft part, which causes the animal to cover it with pearly matter to prevent irritation. The shells also furnish a considerable part of the "mother-o'-pearl" which is so largely used for ornamental purposes. The *Margaritifera radiata*, figured on our plate, is a member of this family.

The scallop is an object well known to the tourist visiting New England summer resorts, who has reveled in "fried scallops." The family to which this belongs (*Pectinidae*) is composed of rounded shells, many with frills or ribs and nearly all ornamented with beautiful colors. Unlike the animals which we have been considering, these mollusks have no siphons and the shell is open all the way around save at the hinge, and the edge of the mantle is provided with little, round, black eyes. It is an interesting sight to observe a beach at low water, the receding tide having left on the shore or in little pools of water hundreds of these mollusks, attached by a byssus to bits of sea weed. As one is gazing wonderingly over this vast field of yellow sand and green weed, an object will suddenly move through a pool of water with astonishing rapidity, accompanying the movement by a quick snapping sound. This is the scallop, which is imprisoned in the pool and which desires to get out. The movement is effected by rapidly closing and opening the two valves of the shell, thereby causing a clicking sound. The noise of several hundred of these shells opening and closing and the sight of as many scallops with strings of sea weed attached to them, shooting through the water, looking not unlike a comet with a long

tail, is quite bewildering. In Europe, the scallop is considered quite a delicacy and several tons are gathered annually. One species (*Pecten jacobaeus*) has been dignified as a badge of several orders of knighthood and it was also worn by pilgrims to the Holy Land a good many years ago. It was called "St. James' Shell."

The most common shell to the layman is the oyster (*Ostrea virginica*), the cultivation of which occupies the attention of a large number of men and the investment of considerable capital. The oyster is free and active when young, but becomes attached to some submerged object early in life. Oyster culturists take advantage of this habit by erecting poles in the water to which the young oysters attach themselves. The shells of the different species of oyster are not generally of much beauty, but a related family, the *Spondylidae*, or spiny oysters, are among the most beautiful of bivalves. In this family the shell is ornamented by many long spines and frills, and the colors are different shades of red, yellow and pink. The most beautiful species are found in the Gulf of California.

The space at our command is far too limited to adequately discuss the many curious and interesting animals which make up the class *Pelecypoda*. Much might be said of the *Solen* or razor-shell, with its curious foot which is so great a help in digging burrows; of the *Pholads*, which perforate and make burrows in clay, wood and even in the hardest rock; and of the strange *Teredo* or "ship-worm," with a long, worm-like body which bores into ships, wharves and any wooden object within reach. But enough has been written and pictured to show the reader that the unpretentious clam, mussel or oyster and their relatives have many interesting habits, are encased in beautiful shells, and that some species are of great economic importance to man.

Frank Collins Baker.

THE PASSING OF SUMMER.

Where have the charms of summer gone?
Part of its sunny, azure skies
The bluebirds southward bore away,
And how could sunset splendors stay,
Or glory of the early dawn,
When not a tanager now vies
With orange-flaming orioles,
And humming-birds no magic bowls
Of nectar drain in gardens fair,
Or flash like jewels through the air?

Where have the summer's beauties flown?
Afar on swallows' purple wings;
With blackbirds' iridescent throats,
And with the thrushes' perfect notes
Of rapture into music grown;
With blue the indigo bunting brings,
A sapphire set with emerald leaves,
And finch-gold that June interweaves
With silver from the kingbird's breast
And studs with pearls of many a nest.

When will the summer come again?
When olive warblers northward fly,
And to their hints of budding green
The grosbeaks add a rosy sheen
Of warming skies: O, not till then
Will summer come and winter die!

—Benjamin Karr.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



THE COLLARED LIZARD.

(*Crotaphytus collaris*.)

The Collared or Ring-necked Lizard may be found among the rocks and open woods of the plateau or in desert regions from southern Missouri southward into Mexico, westward to southeastern California and northward to southern Idaho. However, this is its general range, and it is not common over all this territory. Though it has been known to ascend to an altitude of nearly six thousand feet, yet it does not seem to have crossed the Sierra Nevada range, as it has not been observed at any point on the Pacific coast or the interior of California.

The Collared Lizard is so called because of the black bars, which resemble a collar, and are situated between the fore legs and extend across the back of the animal. They vary greatly in color, depending on their age or geographical position. The back is usually some shade of dull or rather dark green, or it may have a bluish cast, with numerous oblong or rounded lighter spots, which may be either whitish, or various shades of red, orange or yellow. These spots may be quite definite or they may form quite continuous bands. The variations in color are much more marked in the young.

Dr. Cope tells us that "it runs very swiftly, carrying the tail over its back. In its manners it is perhaps the most pugnacious of our lizards, opening its mouth when cornered, and biting savagely. Its sharp teeth can do no more than slightly cut the skin."

Mr. Frank M. Woodruff relates the following interesting account of his experiences with this lizard: "I found the Collared Lizard at three points in Missouri—Vineland, DeSoto and Pilot Knob. They are restricted to the rocky slades, where they live with the scorpions and

the rattlesnakes. The only place where I found them abundant was between Vineland and the old Kingston mines. During the hot summer months they make their appearance upon the broad slabs of rock, often quite a distance from their lairs. When disturbed they make a dash to escape and usually in the direction that leads to their accustomed crevice, even though the intruder is in its path. I have had them run almost across my feet in their frantic efforts to hide. They are a somewhat terrifying object as they run toward you. At this time they apparently assume a partly upright position, looking for all the world like a small edition of Mephistopheles. The negroes are mortally afraid of them. They call them 'Glade Devils,' and the more superstitious believe that the souls of the very bad negroes reside in them. A negro will never go through a glade frequented by this species, and will make a long detour to avoid doing so. The only time I ever saw a negro 'turn gray' was when I brought one of these lizards to Ironton and asked for assistance in capturing it when it escaped. They are so swift in their movements that I found the best method of capturing them was by tying a noose of fine copper wire to a fish pole. This can be slipped over their heads, as they lie sunning themselves, as they seem to pay but little attention to the loop as it touches them. By exercising caution it is possible to approach from the rear to within eight or ten feet without exciting them. They make delightful pets, if a lizard can be considered such. By feeding them through the winter on meal worms and in the summer on flies and grasshoppers they can be kept for a year or more."

A NIGHT IN THE FLOWER GARDEN.

A FAIRY STORY.

The day had passed and the sun had gone to sleep in a bed of crimson and gold. The wind blew softly, at which the leaves on the great trees in the garden began to murmur; though it was evening they were not sleepy like some of the flowers who thought it time to go to sleep when the sun did. Sometimes the leaves were awake all night; you could hear them moving gently in the breeze. The clover leaves were folded close in sleep long ago and the Poppies declared they could not sit up a moment longer. But the tall white Lilies, who loved the night, were wide awake; they could not sleep when the garden was full of moonlight. They said the Crickets were so noisy and the Katydid's so quarrelsome that it disturbed them, so they stood fair and white gathering the dew in their silvery cups which filled the soft night air with sweet perfume. The Roses were looking pale and sad in the moonlight; they reveled in the golden sunshine and grew brilliant in the heat of day. But they were languid now and sometimes a little breeze would send their velvet petals floating to the ground to fade and die.

The Pansies nestled low with closed eyes. You would not have known where the Mignonette and Heliotrope were had you not breathed their sweet perfume, for they were fast asleep. The Nasturtiums, Hollyhocks, and Marigolds were still as bright and gay as if the sun, whom they loved, could see them and they felt like sitting up with the Four O'Clocks and Evening Primroses, who never went to sleep until very late.

But of all the flowers in the garden, the Sweet Peas were the widest awake. There they stood in rows, dainty and fair, never thinking of going to sleep, but trembling with excitement. You could see them whispering together, for they had heard

that to-night the Fairy Queen was to come to the garden and would give a soul to some flower; which one they did not know but hoped it would be to them.

A little Humming Bird had brought the news and had told it only to the Sweet Peas, so they thought it must be for them that this beautiful change was to come. Had they not heard that years ago a sweet flower called Narcissus had been changed into a beautiful youth, who could wander where he wished? What delight that would be! And had they not also heard of Pansies changing into little children, and Larkspurs into larks that soared away into the bright blue sky? Of Water Lilies changing into maidens, who made their homes under the green waves? And they had always thought that myriads of brilliant flowers were changed into the daintiest of all things. The little Humming Birds must have been flowers at one time, for they were always hovering around them, kissing them and making love to them. Oh! if the Fairy Queen would only change them into birds, or velvet bees, or, better still, into the beautiful butterflies, that came to them so often and fluttered like a cloud around them. Yes, they would rather be butterflies than anything else.

Slowly the moonlight faded from the flowers, the shadows of the night deepened and the soft dew fell like a benediction. A Fairy form floated over the sweetest of blossoms, then disappeared, and all was dark and silent save a gentle flutter, as of wings.

But in the morning when the sunbeams had awakened the sleeping blossoms, a flight of bright-winged Butterflies floated in the air or lighted for a moment on the flowers, but the Sweet Peas had all disappeared and were nowhere to be seen.

Fannie Wright Dixon.

RABBIT'S CREAM.

Everyone is well acquainted
With the arts of Frosty Jack—
With his etchings on the windows,
With the tints that mark his track;
But the quaint and merry artist
Has a fancy of his own
That is delicate and graceful,
But is not so widely known.

When no green is in the forest,
And no bloom is in the dell,
Not a flower star to twinkle,
Not the smallest blossom-bell,—
Here and there, an herb he singles,
Brown and dry, and round its stem
Fastens, with his magic fingers,
One great, silver-shining gem;

Shell-like, delicate and dainty,
White and lucent as a pearl;
Just as though he took a fragment
Of the mist, and with a twirl
Froze it into shape and substance—
Such a fine and fragile thing,
That the fairy queen might crush it,
If she brushed it with her wing.

Then he steals away, delighted;
He has planned a morning treat
For a troop who soon will flutter
Through the wood, on dancing feet;
All the little country urchins
Love to see its silver gleam—
Love to fancy it a dainty,
And they call it "rabbit's cream."

—Hattie Whitney.

THE APPLE.

Both pagan and Christian mythologies have endowed the Apple with wonderful virtues. It has possessed a symbolism for man in all stages of civilization. Standing for the type of the earthly in its contrast with the spiritual, it represented the idea of that conflict between Ormuzd and Arimanes in which the evil principle is continually victor. The stories of Eve, of Paris, the Hesperides and Atalanta all emphasize this thought, showing the Apple to have been a reward of appetite over conscience.

The allegorical tree of knowledge bore apples guarded by the serpent, and the golden fruit of the garden of Hesperides was apples protected by the sleepless dragon, which it was one of the triumphs of Hercules to slay. The Assyrian tree Gavkerena, the Persian "Jima's Paradise," "Indra's heaven" and the Scandinavian ash tree Yggdrasil, all prefaced the story of Paris and the apple of discord which Ate brought to the banquet of the gods. In Greece it became the emblem of love, being dedicated to Venus. Aphrodite bore it in her hand as well as Eve, and it is said that Ulysses longed for it in the garden of Alcinous, while Tantalus vainly grasped for it in hades. The fruit was offered as a prize in the Grecian games given in honor of Apollo.

Among the heathen gods of the north there were apples fabled to possess the power of conferring immortality, which were carefully watched over by the goddess Iduna and jealously preserved for the dessert of the gods who experienced the enervation of old age. Azrael accomplished his mission by holding the apple to the nostrils of his victims, and the Scandinavian genii are said to have possessed the power of turning the fruit into gold.

The ancients better appreciated the im-

portance of the apple than do the moderns, who treat it chiefly as "the embryonic condition of cider or as something to be metamorphosed into pies." It is said to be indigenous to every part of the inhabited globe except South America and the islands of the Pacific. It is equally at home in the fierce heat of the equator and among the frosts of Siberia. In olden times, the fig was the index of a native civilization. Later on, the vine was king, but at the present time there are many who maintain that the Apple is the only genuine index of civilized man, and claim that it flourishes best in those regions where man's moral and intellectual supremacy is most marked.

The Athenians made frequent mention of the cultivation of the Apple, and Pliny enumerates twenty varieties that were known in his day. It is generally supposed that the Goths and Vandals introduced the manufacture and use of cider into the Mediterranean provinces and references to it are made by Tertullian and the African Fathers. The use of cider can be traced from Africa into the Biscayan provinces of Spain, and thence to Normandy. It is supposed to have come into England at the time of the conquest, but the word "cyder" is said to be Anglo-Saxon, and there is reason to believe that it was known in the island as early as the time of Henghist. As the mistletoe grew chiefly on the apple and the oak, the former was regarded with great respect by the ancient Druids of Britain, and even to this day in some parts of England, the antique custom of saluting the apple trees in the orchards, in the hope of obtaining a good crop the next year, still lingers among the farmers of Devonshire and Herefordshire. During the middle ages, the fruit was made the pretext for massacring the op-



PRESENTED BY LOUIS KUNZE.
1883

APPLES.
(Jonathan.)

COPYRIGHT 1881, BY
A. W. MUMFORD, CHICAGO.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

pressed tribes of Israel, as it was supposed that the Hebrews used apples to entice children into their homes to furnish their cannibal banquets.

The different varieties of apples have all descended from a species of crab found wild in most parts of Europe. Although there are two or three species of wild crab belonging to this country, yet none of our cultivated varieties have been raised from them, but rather from seeds of the species brought here by the colonists from Europe—over two hundred varieties of apples are known at the present time. As a rule, the Apple is a hardy, slow-growing tree, with an irregular head, rigid branches, roughish bark, and a close-grained wood. It thrives best in limestone soils and deep loams. It will not flourish in wet soils or on those of a peaty or sandy character. As a rule, the trees live to be fifty or eighty years of

age, but there are specimens now bearing fruit in this country that are known to be over two hundred years old. The wood is often stained black and used as ebony. It is also made into shoe lasts, cog-wheels and small articles of furniture, and is greatly prized in Italy for wood carving and statuary.

New and choice varieties of apples are derived from seeds planted to produce stocks. One stock in ten thousand may prove better than the original, and its virtues are perpetuated by layers, cuttings, graftings and budding. The tree is not subject to disease. Insects, notably the borer, the woolly aphis, the caterpillar, the apple moth and the bark louse, have to be guarded against, and several blights occasionally attack the foliage, but as a rule small loss is experienced from these sources.

Charles S. Raddin.

Shed no tear!—O shed no tear,
The flower will bloom another year.
Weep no more!—O weep no more,
Young buds sleep in the roots' white core.
Dry your eyes!—O dry your eyes
For I was taught in Paradise
To ease my breast of melodies—
Shed no tear!

Overhead!—look overhead
'Mong the blossoms white and red.
Look up! Look up!—I flutter now
On this flush pomegranate bough.
See me! 'Tis this silvery bill
Ever cures the good man's ill.
Shed no tear!—O shed no tear!
The flower will bloom another year.
Adieu!—adieu!—I fly, adieu—
I vanish in the heaven's blue.

Adieu!—adieu!

—John Keats.

GEOGRAPHIC DISTRIBUTION OF SEED-BEARING PLANTS.

This is one of the most difficult and important subjects connected with the study of plants. Before it can be well organized it will be necessary to bring together very many more observations of plants in all parts of the world than is possible now. However, a few facts are known which are both interesting and suggestive. In order to make their presentation as definite as possible, this paper will be restricted to a brief account of the geographic distribution of seed plants.

One of the two great groups of seed plants is known as the Gymnosperms, a group which in our region is represented by pines, spruces, hemlocks, cedars, etc. In the tropics the group is represented by a very different type of trees, known as the Cycads. They resemble in general habit tree-ferns, or palms. The group of Gymnosperms with which we are acquainted have been called Conifers on account of the very characteristic cones which they bear. Several principles connected with geographic distribution may be illustrated by considering briefly these two groups of Gymnosperms.

The Cycads are absolutely restricted to the tropics, a few forms reaching into semi-tropical conditions, as in southern Florida. If a comparison be made between the eastern and western tropics, it will be discovered that the Cycads are almost equally divided between the two regions. For an unknown time, but certainly a very long one, these eastern and western Cycads have been separated from one another. As a consequence they have become so unlike that one kind of Cycad is never found in both hemispheres. Their long separation from one another, and their somewhat different conditions of living, have resulted in working out differences of structures which botanists recognize as species, genera, etc.

The Conifers, on the other hand, are characteristic of temperate regions. If the distribution of Conifers were indicated upon a world map, there would be shown a heavy massing of them in the northern region and a lighter massing in the southern region, the two being separated from one another by a broad tropical belt. This tropical belt is traversed in just two places; one is by means of the East Indian bridge, across which certain Australasian forms reach China and Japan; the other is the chain of the Andes mountains, along which a single northern type has worked its way into the southern part of South America. The two great masses of Conifers, therefore, lie in the northern and southern hemispheres, rather than in the eastern and western hemispheres, as is the case with the Cycads. This long separation has resulted just as it did with the Cycads; that is, the northern and southern Conifers are not any longer alike, but differ so widely from one another that botanists cannot discover any form which is common to both the northern and southern hemispheres, excepting the single one already mentioned, which has succeeded in crossing the tropics by means of the Andes bridge.

Another interesting fact in connection with the distribution of the Conifers is that their great centers of display are in regions which border the Pacific Ocean, and they have often been spoken of as a Pacific group. There are three special centers of display; one is the China-Japan region, a second is the general Australasian region, and the third is western North America. Just why this border region of the Pacific is especially favorable for this sort of plant life is a question which we do not as yet pretend to answer. Another fact which illustrates this persistent distribution in connection with

the Pacific is that in the case of the Conifers which belong to the southern hemisphere, the continental masses which pair in the display of similar forms are Australia and South America.

Another fact, which is true of all large groups, is that certain forms have a very extensive distribution, and others are very much restricted in their occurrence. For example, the greatest genus of Conifers is the genus made up by the pines, at least seventy kinds of which are recognized. This great genus sweeps throughout all the north temperate regions of the globe. There is a similar extensive distribution of the different kinds of spruce, larch, juniper, etc. On the other hand, the giant redwood, known as *Sequoia*, is restricted to certain comparatively small areas in California. In China and Japan, and also in Australia, there are numerous illustrations of forms very much restricted in their occurrence.

The other great group of seed plants is known as the Angiosperms, and to it belong all those seed plants which are most commonly met in this region. The distribution of Angiosperms is a very much more difficult question than that of Gymnosperms; for while there are only about four hundred kinds of living Gymnosperms, there are more than one hundred thousand kinds of living Angiosperms. In presenting the distribution of this great group, it will be necessary to consider its two main divisions separately, for they differ from one another very much. One of the groups is known as the Monocotyledons, to which belong such forms as the grasses, lilies, palms, orchids, etc.

Some prominent facts in reference to the geographical distribution of these Monocotyledons are as follows: They contain four great families, which include almost one-half of their number, and which have become world-wide in their distribution. These families are the grasses, the sedges, the lilies, and the irises. This world-wide distribution means that these families have succeeded in adapting themselves to every condition of soil and climate. In this world-distribution the grasses easily lead, not only among Monocotyledons, but among all seed plants.

Another fact in reference to the Mono-

cotyledons is that they include an unusual number of families which are entirely aquatic in their habit. These aquatic families are also world-wide in their distribution, so far as fresh and brackish waters can be called world-wide. It is important to notice that while the world-families which belong to the land have worked out about ten thousand different forms, the world-families which belong to the water have worked out considerably less than two hundred different forms. This seems to indicate that the great number in the one case is due to the very diverse conditions of the land, while the small number in the latter case is due to the very uniform conditions of water life.

A third fact of importance is that the Monocotyledons are mainly massed in the tropics, and in this sense are almost an exact contrast to the Conifers we have been considering above. The same effect of separation in working out diversity in structure is shown by the Monocotyledons as was shown by the eastern and western Cycads, and the northern and southern Conifers. For example, the palms represent the great tree group of Monocotyledons, and are restricted to the tropics as rigidly as are the Cycads. They are found in about equal numbers in the eastern and western tropics, but there are no forms in common. The eastern and western forms have become so different that they might almost be regarded as different families.

The Monocotyledons are also somewhat famous for the number of air plants which they contain—that is, plants which have sometimes been called “perchers,” because they fasten themselves upon trunks and branches and supports of various kinds, and absorb what they need directly from the air. It is a notable fact that these so-called “perchers” are very much more abundant in the western tropics than in the eastern. An explanation for this is to be found in the fact that the western tropics have a very much greater rainfall; in fact, in the rainy woods of the Amazon region the air is saturated with water, and everything is dripping.

One of the facts in connection with the distribution of Monocotyledons is quite puzzling, and that is the very poor representation of the whole group in the south-

ern hemisphere. In examining the distribution of other groups in the southern hemisphere, it is found that Australia and its general vicinity is prolific in peculiar forms. In the case of the Monocotyledons, however, the Australasian region is the most poverty-stricken one in all the southern hemisphere. Just why the southern hemisphere in general, and the Australasian region in particular, are unfavorable for Monocotyledons, it is hard to say. Of course in these cases the world-families already mentioned are represented.

The other great division of Angiosperms is known as Dicotyledons, which include such forms as our common forest trees, buttercups, roses, peas, mints, sunflowers, etc. As there are about eighty thousand of these Dicotyledons, it is impossible to state anything very definite in reference to the distribution of the group as a whole. Taking the higher forms, however, as representing the general tendency of the group, some of the facts of distribution are as follows:

It has been noticed that the Monocotyledons are massed in the tropics, and that the temperate and boreal regions have been left comparatively free by previous groups, with the exception of the Conifers, which only develop tree types. With the coming of the Dicotyledons, therefore, the vast temperate and boreal regions presented a particularly favorable field, which they have entered and taken possession of. This vast group is prominently adapted to living in the unoccupied temperate and boreal regions. This does not mean that they are not found in the tropics for they hold their own there with the other groups.

Dicotyledons, however, succeeded in working out but three world-families: Composites, to which the sunflowers, dandelions, etc., belong; the Mints; and the Plantains. There are other large families which characterize certain great areas, but they are not world-wide in their distribution.

Another fact, which might indicate that the Dicotyledons have taken possession of comparatively unoccupied regions only, is that they are very poorly represented, so far as higher groups are concerned, in aquatic conditions. It would seem as though the conditions of life in the water had been fairly well taken up by other groups. In looking over the display of Dicotyledons in the tropics of the eastern and western hemispheres, it becomes evident that there is no such difference between the forms of the two regions as in the groups previously mentioned. It will be remembered, however, that in the case of the Cycads and palms, which were used as illustrations, they are restricted to the tropics, and their eastern and western forms are separated from one another, not merely by oceans, but by temperate and boreal lands. In the case of Dicotyledons this is different, for while they are found in the tropics, they are found in the other regions as well, and have better chances for intermingling than the other groups.

This tropical display of Dicotyledons further shows the great prominence of America in the display of forms. This appears not merely in the greater number of peculiar forms and often families which appear in tropical America; but whenever the continents are paired in the display of forms, America is always one of the pair, Asia or Africa being the other member.

It will be recognized from what has been said that the whole subject of geographic distribution is a very extensive one, and that it will be a long time before the important facts are recorded. The importance of the subject rests not so much upon the mere presence of certain plants in certain regions, but it has to do with explaining just why the conditions are suited to the plants, and also just how the plants have come to be what they are and where they are.

John Merle Coulter.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



VANILLA.

(*Vanilla planifolia*, Andrews.)

You flavor everything; you are the *vanille* of society.—Sydney Smith: Works, p. 329.

Vanilla planifolia belongs to the Orchid family (Orchidaceae), though it has many characteristics not common to most members of the family. It is a fleshy, dark-green perennial climber, adhering to trees by its aerial roots, which are produced at the nodes. The stem attains a length of many feet, reaching to the very tops of the supporting trees. The young plant roots in the ground, but as the stem grows in length, winding about its support and clinging to it by the aerial roots, it loses the subterranean roots and the plant establishes itself as a saprophyte or partial parasite, life habits common to orchids. The leaves are entire, dark-green, and sessile. Inflorescence consists of eight to ten flowers sessile upon axillary spikes. The flowers are a pale greenish yellow, perianth rather fleshy and soon falls away from the ovary or young fruit, which is a pod, and by the casual observer would be taken for the flower stalk. The mature fruit is a brown curved pod six to eight inches long, smooth, splitting lengthwise in two unequal parts, thus liberating the numerous, very small, oval or lenticular seeds.

There are several species of vanilla indigenous to Eastern Mexico, growing in warm, moist, shaded forests. It is now extensively cultivated in Mexico; also in Mauritius, Bourbon, Madagascar and Java. It is extensively grown in hothouses of England and other temperate countries. The wild growing plants no doubt depended upon certain insects for pollination, but with the cultivated plants this is effected artificially by means of a small brush.

The word vanilla is derived from the Spanish vainilla, the diminutive of vaina, meaning a sheath or pod, in reference to the fruit. There is little doubt that the natives of Mexico employed vanilla as a flavor for cocoa long before the discovery of America. We received our first description of the plant from the Span-

ish physician Hernandez, who, during 1571-1577 explored New Spain or Mexico. In 1602, Morgan, apothecary to Queen Elizabeth, sent specimens of the fruit to Clusius, who described it independently of Hernandez. In 1694 vanilla was imported to Europe by way of Spain. In France it was much used for flavoring chocolate and tobacco. During the first half of the eighteenth century it was extensively used in Europe, particularly in England, after which it seems to have gradually disappeared. Now it is, however, again very abundantly employed in nearly all countries.

Vanilla must be cultivated with great care. In Mexico a clearing is made in the forest, leaving a few trees twelve to fifteen feet apart to serve as a support for the vanilla plants. Cuttings of the vanilla stems are made three to five feet in length, one cutting being inserted into the soil to a depth of about ten inches near each tree. The cuttings become rooted in about one month and grow quite rapidly, but do not begin to bear fruit until the third year and continue to bear for about thirty years. In Reunion, Mauritius and the Seychelles the young plants are supported by a rude trellis fastened between the trunks of trees. In cultivation pollination is universally effected artificially; the pollen being transplanted from one flower to another by means of a small brush or pencil. Only the finest flowers are thus fertilized so as to prevent exhaustion and to insure a good commercial article. Among wild growing plants pollination is effected through the agency of insects, which evidently do not occur in the vicinity of the plantations; thus man is called upon to assist nature. The pods are cut off separately as they ripen; if over-ripe they are apt to split in drying; if collected green the product will be of an inferior quality.

The peculiar fragrance of the vanilla pods is due to vanillin, which occurs upon

the exterior of the dried fruit in the form of a crystalline deposit, which serves as a criterion of quality. This substance does not pre-exist in the ripe fruit. It is developed in the process of drying and fermentation. In Mexico the collected pods are placed in heaps under a shed until they begin to wilt or shrivel, whereupon they are subjected to the sweating process conducted as follows: The pods are wrapped in woolen cloth and exposed to the sun during the day or heated in an oven at 140° F., then enclosed in air-tight boxes at night to sweat. In twenty-four to thirty-six hours they assume a chestnut-brown color. They are then dried in the sun for several months.

In Reunion the pods are first scalded for a few minutes in boiling hot water, then exposed to the sun for about one week, wrapped in woolen blankets; then spread out and dried under sheds, turning frequently so as to insure uniform drying. When the pods can be twisted around the finger without splitting or cracking the "smoothing process" begins. This consists in rolling the pods between the fingers to distribute the unctuous liquid, which exudes during the sweating process (fermentation), and to which the pods owe their lustre and suppleness.

Vanilla workers are apt to suffer from an affection known as vanillism, characterized by an itching eruption of the skin, nasal catarrh, more or less headache and muscular pain. By some this is said to be caused by a poisonous substance in the vanilla or perhaps the oil of cashew, with which the pods are coated. According to others the trouble, at least the itching and eruption, is caused by a species of *acarus* (itch mite) found upon the pod. It must also be borne in mind that most of these workers are anything but cleanly in their habits. Bacteria, dirt, etc., find their way to the pods from the dirty hands of the workmen. The entire process of gathering, sweating, drying, smoothing and packing, as carried on in Mexico and South American countries is not con-

ducted in accordance with recognized sanitary rules.

There are a number of commercial varieties of vanilla named after the countries in which they are grown or after the centers of export, as Mexican, Vera Cruz, Bourbon, Mauritius, Java, La Guayra, Honduras and Brazilian vanilla. The most highly valued Mexican variety is known as *Vainilla de leg* (leg, meaning law). The pods are long, dark-brown, very fragrant and coated with crystals. Since vanilla is a costly article adulteration is quite common. Useless pods are coated with balsam of Peru to give them a good appearance. Split, empty pods are filled with some worthless material, glued together and coated with balsam of Peru.

Vanillin also occurs in Siam benzoin, in raw beet-sugar and in cloves. It has been artificially prepared from coniferin, a substance found in the sap-wood of fir-trees, and from *asafoetida*. In Germany commercial vanilla is now largely prepared from eugenol, a constituent of oil of cloves.

Vanillin seems to have some special action upon the nervous system, and has been employed in the treatment of hysteria. It is also used to disguise disagreeable tastes and odors of medicines, as in lozenges and mixtures. Its principal use is that of spice for flavoring chocolate, confectionery, ices, ice-cream, drinks, pastry; in the preparation of perfumery, sachet powders, etc. It has a very pleasant, delicate aroma when properly diluted and can be very effectively combined with other odors. Vanilla, combined with almonds, simulates heliotrope.

The poisonous effects of ice creams flavored with vanilla are perhaps not due to vanillin, but to toxins formed by bacteria found upon vanilla pods, or the bacteria of the milk and cream used.

Description of Plate—A, flowering twig; 1, 2, 3, corolla; 4, 5, pistil; 6, 7, stamen; 9, pollen; 10, 11, fruit; 12, 13, seed.

Albert Schneider.



BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IX.

FEBRUARY, 1901.

No. 2

FEBRUARY.

Still lie the sheltering snows, undimmed and white;
And reigns the winter's pregnant silence still;
No sign of spring, save that the catkins fill,
And willow stems grow daily red and bright.
These are the days when ancients held a rite
Of expiation for the old year's ill,
And prayer to purify the new year's will;
Fit days, ere yet the spring rains blur the sight,
Ere yet the bounding blood grows hot with haste,
And dreaming thoughts grow heavy with a greed
The ardent summer's joy to have and taste;
Fit days, to give to last year's losses heed,
To reckon clear the new life's sterner need;
Fit days, for Feast of Expiation placed!

—Helen Hunt Jackson.

FROST-WORK.

These winter nights, against my window-pane
Nature with busy pencil draws designs
Of ferns and blossoms and fine spray of pines,
Oak-leaf and acorn and fantastic vines,
Which she will make when summer comes again—
Quaint arabesques in argent, flat and cold,
Like curious Chinese etchings . . . By and by,
Walking my leafy garden as of old,
These frosty fantasies shall charm my eye
In azure, damask, emerald, and gold.

—Thomas Bailey Aldrich.

THE HAWKS.

Among the birds that are most useful to man may be classed the Hawks. They, with the vultures, the eagles and the owls, belong to the bird order Raptores, or birds of prey. Unlike the vultures the Hawks feed upon living prey while the former seek the dead or dying animal. The vultures are often called "Nature's Scavengers," and in many localities they have been so carefully protected that they will frequent the streets of towns, seeking food in the gutters.

The family Falconidae, which includes the Hawks, the falcons, the vultures, the kites, and the eagles—all diurnal birds of prey—numbers about three hundred and fifty species, of which between forty and fifty are found in North America. The remainder are distributed throughout the world.

The flight of the Hawks is more than beautiful, it is majestic. Even when perched high in the air on the top of a dead monarch of the forest, there is a silent dignity in their pose. It is from these perches that some of the species watch the surrounding country for their prey, swooping down upon it when observed and seizing it in their long, sharp and curved claws. Their food is almost invariably captured while on the wing. The bill, which is short, hooked and with sinuate cutting edges, is used for tearing the flesh of its victim into shreds.

Among our more common hawks there are but five or six that may truthfully be classed among the birds that are injurious to the interests of man. Among these, the Cooper's hawk and the sharp-shinned hawk deserve the most attention, as they feed almost entirely upon other birds and poultry. To these two the name chicken hawk may be aptly applied. The domestic pigeon is a dainty morsel for these ravagers of the barnyard. On the other hand, by far the larger

number of the Hawks are of great value to man. They are gluttonous whenever the food supply is unlimited, and, as their powers of digestion are wonderfully developed, it takes but a short time for the food to be absorbed and they are then ready for more. With their keen eyesight they readily detect the rodents and other small mammals that are so destructive to crops and with a remarkable swiftness of flight they pounce upon them. Dr. Fisher says, "Of the rapacious birds with which our country is so well furnished, there are but few which deserve to be put on the black list and pursued without mercy. The greater number either pass their whole lives in the constant performance of acts of direct benefit to man or else more than make good the harm they do in the destruction of insectivorous birds and poultry by destroying a much greater number of mammals well known to be hostile to the farmer."

Dr. Fisher obtained the following results from the examination of the stomachs of two thousand, two hundred and twelve birds of prey. This number does not include any of those that feed extensively upon game and poultry. In three and one-half per centum the remains of poultry or game birds were found; eleven per centum contained remains of other birds; forty-two and one-half per centum contained the remains of mice; in fourteen per centum other mammals were found and twenty-seven per centum contained insect remains. This summary includes not only the Hawks but also the owls, eagles and related birds. It is evident from these results that man has a friend in these birds that is of inestimable value to him.

The use of falcons and Hawks in the chase dates far back in the history of the Old World. For ages it was one of the



YOUNG RED-TAILED HAWK HOLDING A QUAIL.
(*Buteo borealis*.)

AMERICAN ROUGH-LEGGED HAWK.
(*Archibuteo lagopus sancti-johannis*.)
About $\frac{1}{2}$ Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

principal sports of mankind and especially of the nobility. Hawks may be trained to a high degree of efficiency in the capturing of other birds. It is said that the Chinese knew of this characteristic of the Hawks at least two thousand years before the time of Christ. In Japan the art of falconry was practiced about six or seven hundred years before Christ.

The art is also believed to be represented in a bas-relief found in the Khorsabad ruins in which a falconer is apparently bearing a hawk on his wrist. Thus these ancient ruins of Nineveh show that the art must have been known at least seventeen hundred years before Christ.

That falconry was known to the ancient races of Africa is highly probable, though there is but little in the earlier written history of that continent regarding it. Egyptian carvings and drawings, however, indicate without a doubt that the art was there known centuries ago. Falconry is still practiced to some extent in Africa.

The art, though not obsolete in those countries of Europe where, in the middle ages, it was regarded as the greatest and most noble of all sports, is not national in its character. During the reign of William the Conqueror laws were enacted in England which were most stringent regarding falconry. At one time "falcons and hawks were allotted to degrees and orders of men according to rank and station, to royalty the jерfalcon, to an earl the peregrine, to a yeoman the goshawk, to a priest the sparrow-hawk, and to a knave or servant the useless kestrel."

To train a hawk for this sport requires great skill and patience. The temper, disposition and, in fact, every peculiarity of each individual bird must be carefully studied. In these respects it may be said that no two birds are exactly alike. Technically the name falcon, as used by the falconer, is applied only to the female of the various species used in the conducting of this sport.

The peregrine falcon or hawk is usually accepted as the type falcon of falconry. The name peregrine, from the Latin *peregrinus*, means wandering, and refers to the fact that this species is almost cosmopolitan, though the geo-

graphical races are given varietal names. The duck hawk (*Falco peregrinus anatum*) is one of the representatives in America. "The food of this hawk consists almost exclusively of birds, of which water-fowl and shore birds form the greater part."

The Hawks of our illustration are natives of North America ranging from Mexico northward. The American Rough-legged Hawk (*Archibuteo lagopus sancti-johannis*) is a geographical variety of a rough-legged form that is found in northern Europe and Asia. It is also known by the names of Black Rough-legged and Black Hawk.

This Hawk is one of the largest and most attractive of all the species of North America. Dr. Fisher tells us that "it is mild and gentle in disposition, and even when adult may be tamed in the course of a few days so that it will take food from the hand and allow its head and back to be stroked. When caged with other species of hawks, it does not as a rule fight for the food, but waits until the others have finished, before it begins to eat."

In spite of its large size and apparent strength it does not exhibit the spirit that is so characteristic of the falcons. It preys almost entirely on field mice and other rodents, frogs and probably, at times and in certain localities, upon insects especially the grasshoppers. It is said that they will feed upon lizards, snakes and toads. They do not molest the poultry of the farmer or the game birds of the field, forest or of our water courses, at least not to any extent. Their size and their slow and heavy flight would nearly always give sufficient warning to permit the ordinary fowls to seek cover.

No better evidence as to the character of its food can be furnished than the results of the examination of forty-nine stomachs as related by Dr. Fisher. Of these forty contained mice; five, other mammals; one, lizards; one, the remains of seventy insects (this specimen was killed in Nebraska); and four, were empty. It is interesting to note "that the southern limit of its wanderings in winter is nearly coincident with the southern boundary of the region inhabited by meadow mice."

Sir John Richardson says, "In the softness and fullness of its plumage, its feathered legs and habits, this bird bears some resemblance to the owls. It flies slowly, sits for a long time on the bough of a tree, watching for mice, frogs, etc., and is often seen sailing over swampy pieces of ground, and hunting for its prey by the subdued daylight, which illuminates even the midnight hours in the high parallels of latitude." Mr. Ridgway says, "for noble presence and piercing eye this bird has few equals among our Falconidae."

The eggs of this species vary from two to five and are usually somewhat blotched or irregularly marked with chocolate brown on a dull white background.

The Red-tailed Hawk (*Buteo borealis*) of our illustration is young and shows the plumage of the immature form.

This species may be called our winter hawk and for this reason the name *borealis* is most appropriate. "The coldest days of January serve to give this hawk a keener eye and a deeper zest for the chase." The best locality to seek the Red-tail may be found at the wooded borders of pastures and streams, where it can easily perceive and swoop down upon its prey. It seldom visits a barnyard, but will occasionally catch a fowl that has strayed away from the protection of buildings. Its food consists to a great extent of meadow and other species of mice, rabbits and other rodents. The remains of toads, frogs and snakes have also been found in its stomach. One writer says, "The Red-tailed Hawk is a powerful bird and I once saw one strike a full-grown muskrat, which it tore to pieces and devoured the greater part."

Dr. Fisher gives an interesting summary of the examination of five hundred and sixty-two stomachs. Fifty-four contained poultry or game birds; fifty-one,

other birds; two hundred and seventy-eight contained mice; one hundred and thirty-one, other mammals; thirty-seven, frogs and related animals or reptiles; forty-seven, insects; eight, crawfish; one, centipedes; thirteen, offal, and eighty-nine were empty. This surely is not a bad showing for this bird, so often maligned by being called "hen" or "chicken-hawk." Its preferred food is evidently the smaller mammals, and as it is common or even abundant it must be of great value to agricultural interests. The younger birds are more apt to take poultry because of "a lack of skill in procuring a sufficient quantity of the more usual prey."

Mr. P. M. Silloway says, "None of the Hawks has suffered more undeserved persecution than has the Red-tailed Buzzard or Hawk, whose characteristics place it among the ignoble falcons, or hawks, of feudal times. Lacking the swiftness and impetuosity of attack peculiar to the true falcons, it depends on its ability to surprise its prey and drop upon it when unable to escape."

During the summer months it retires to the forests to breed, where it builds a large and bulky though shallow nest in trees, often at a height of from fifty to seventy-five feet from the ground. The nest is constructed of sticks and small twigs and lined with grass, moss, feathers or other soft materials. The number of eggs is usually three, though there may be two or four. They are a little over two inches long and less than two inches in diameter. They are dull whitish in color and usually somewhat marked with various shades of brown.

The full plumage of the adult is not acquired for some time and the bird has been long full grown before the characteristic red color of the tail appears.

Seth Mindwell.

INTERESTING STONE HOUSES.

While the children were playing in a small brook, they found something entirely new to them, and as usual, came with hands full, shouting, "We have found something new! Do you know what these are?"

These new treasures proved to be the larvae of the caddis fly in their stone houses. This little creature is noted for its complete metamorphosis. The female fly often descends to the depth of a foot or more in water to deposit her eggs. As the eggs hatch the habits of their larvae are exceedingly interesting.

They are aquatic, being long, softish grubs, with six feet. The fish are very fond of them, for which reason they are in great demand for bait. The angler looks for "cad-bait" along the edges of streams, under stones, or on the stalks of aquatic plants. One can easily see that their lives are not free from care and danger, and so to protect themselves, they are very wise in building cylindrical cases in which they live during this dangerous period. The different species, of which there are many, seem to have their individual preference as to the substance which they employ in building these houses, some using bits of wood, others shells, pebbles, or straws. They readily disregard these preferences when there is a lack of the material which they usually prefer.

Those brought to me were made of different colored pebbles and were very pretty homes. We counted the pebbles in one of them and found there were eighty-nine used, and built so securely that it could not be easily crushed by our fingers. They were all about an inch in length, a quarter of an inch in diameter and were perfect cylinders with a large pebble fastening one end; so no fish could catch them unawares. We placed them in water, where we could watch their development. They never willingly left their

homes, only thrusting the head and a portion of the body out in search of food.

When about to pass into the torpid pupa state, they fastened their houses to some sticks and stones in the water, and then closed the end with a strong silken grating, which allowed the water to pass freely through their houses, keeping them sweet and fresh. We are told that this fresh water is necessary for the respiration of the pupa. Thus they remain quiet for a time until they are ready to assume the imago form. When that important period arrives they make an opening in the silken grating with a pair of hooked jaws, which seem to have developed while resting in the pupa state. They also have become efficient swimmers, using their long hind legs to assist them. After enjoying this new exercise of swimming for a short time they evidently become anxious for a wider experience, and coming to the surface of the water, usually climbing up some plant, the skin of the swimmer gapes open and out flies the perfect insect. Sometimes this final change takes place on the surface of the water, when they use their deserted skin as a sort of raft, from which to rise into the air, and away they go to new fields and new experiences. These insects are known as the caddis-fly of the order Neuroptera, having four wings, measuring about an inch when full spread, with branched nervures, of which the anterior pair are clothed with hairs; the posterior pair are folded in repose. The head is furnished with a pair of large eyes, with three ocelli, and the antennae are generally very long.

If you know the haunts of this interesting house builder, scatter some bright sand and tiny pebbles in the water, and when they are deserted, gather the houses for your collection.

Rest H. Metcalf.

THE ALASKAN SPARROW.

There's a far-away country, a wonderful land
That the twilight loves best, where the finger of God
Touched the land into shadows; unlighted they stand
As they stood at the first over-ocean and sod,

And the cloud and the mountain are one; all unheard
Is the murmur of traffic, the sigh of unrest,
And the King of the land is a golden-crowned bird
With a robe of plain brown and an ashy-gray vest.

Where the shadows are deepest a musical sound
Cleaves their darkness, the song of the golden-crowned King.
Never day is so dark but the sweet notes are heard,
Never forest so dense but the melodies ring.

Sing on, little King of the twilight land, sing,
Thy kingdom extend through the oncoming days,
Till the spaces between us with music shall ring,
And the world hush its breath but to listen and praise.

—Nelly Hart Woodworth.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



DOWITCHER.
(*Macrorhamphus griseus*.)
Nearly $\frac{2}{3}$ Life-size.

THE DOWITCHER.

(*Macrorhamphus griseus*.)

The range of the Dowitcher is limited to the eastern part of North America. It has been reported as far west as the Mississippi river. It breeds in the far north, usually within the Arctic Circle. Its migration is extensive for it winters in Florida, the West Indies and in the northern portion of South America.

The Dowitcher is one of the best known of our coast birds. It bears many popular names, such as Gray Snipe, Gray-back, Dowitch, Driver, Brown-back and Bay Bird. The generic name *Macrorhamphus* is derived from two Greek words, *makros*, meaning large, and *rhamphos*, meaning bill. The specific name *griseus* means gray, and probably has reference to the grayish color of the winter plumage.

The Dowitchers are the most numerous of the seaside snipes. Inland it is replaced by the Long-billed Dowitcher (*Macrorhamphus scolopaceus*), which has a longer bill and is a little larger. Mr. Wilson, in his *Ornithology*, gives the following interesting account of their habits: "They frequent the sandbars and mud of flats at low water in search of food and, being less suspicious of a boat than of a person on shore, they are easily approached by this medium and shot down in great numbers. I have frequently

amused myself with the various actions of these birds. They fly rapidly, sometimes wheeling, coursing and doubling along the surface of the marshes; then shooting high in the air, there separating and forming in various bodies, uttering a kind of quivering whistle." At the retreat of the tide flocks will frequently settle on the shore in such large numbers and so close together that several dozen have been killed at a single shot.

Mr. Chapman tells us that "they migrate in compact flocks, which are easily attracted to decoys by an imitation of their call. Mud-flats and bars exposed by the falling tide are their chosen feeding grounds. On the Gulf coast of Florida I have seen several hundred gathered in such close rank that they entirely concealed the sandbar on which they were resting."

In summer the general color of these birds is dark-brown and the feathers are more or less edged with a reddish tinge. Underneath, the general color is light cinnamon, with white on the belly. In the winter the plumage is more gray and the under parts are much lighter in color.

This bird usually lays four eggs of a buffy olive color, which are marked by brown, especially near the larger end.

All the beautiful stars of the sky,
The silver doves of the forest of Night,
Over the dull earth swarm and fly,
Companions of our flight.

—James Thomson.

SOME THINGS WE MIGHT LEARN FROM THE LOWER ANIMALS.

Man has been instructed in many things by lower animals, but there is yet much to be learned. It is said that the first suspension bridge across the Niagara was constructed after the plainest sort of hint from a spider. Yet we have never found the name of Mr. Spider cut upon the buttresses of a bridge. Who knows but that the builders of the pyramids of ancient Egypt copied their engineering plans from the ants who for generations had pursued similar methods in the architecture of their cities? Spiders had been ballooning for many centuries before man swung his first parachute to the breeze. In fact, there is a species of spider, which, although they have no wings, are able to spin for themselves a sort of apparatus by means of which they navigate the air; yet man, with all his boasted intelligence, has not accomplished this, even with the most complicated machinery. So I might go on to suggest many mechanical and economic contrivances used by lower animals, some of which man has copied but many of which he has as yet been unable to equal.

Before the first potter of old had fashioned a vase or a jug the Eumenes fraterna had constructed his dainty little jugs of mud. But the making of jugs is not the only art man might learn from this little wasp. Upon examination we find the jug filled with small green caterpillars. After depositing her egg Mrs. Wasp thus provides for her baby when it shall appear upon the field of action. Now the peculiar part of this proceeding to which I wish to call attention is that the worm is not dead, but is merely in a comatose state. If it had been killed it would have putrified and entirely disappeared before the young wasp was hatched. Furthermore, the young wasp is fond of fresh caterpillar steak, preferably from the living animal. So Mrs. Wasp must have a method of preserving the fresh liv-

ing victim for her rapacious progeny next spring, while he is too young to hunt for himself, and while the caterpillars are still securely hiding in their mummy cases, Mrs. Wasp finds the venturesome young caterpillar crawling somewhere, and pouncing upon him, carefully inserts her sting into the nerve ganglia that are located in a line along his dorsal surface. We don't know how she learned the exact location of the ganglia and that a few well-directed stabs will produce more effect than hundreds of misdirected thrusts in other parts of the body, but it is certainly true that she selects the very segments in which the ganglia are located to inflict the wound. And she had the location of these nerve centers for a long time before biologists made the discovery. What a fine thing it would be for the biologist if he could learn the secret of thus preserving living animals instead of the stiff, discolored and uninteresting alcoholic specimens. Then think of the economic value of such a discovery. Animals could be fattened in summer at much smaller expense and then injected and set away until needed. We would have no more difficulty in providing our armies with beef on the hoof, and fresh meat could be shipped at much less expense over long distances, as no ice would be necessary. We would have no more complaint of embalmed beef and putrid canned goods.

The common mud wasp that builds in old garrets fills his nest with a species of spider much relished by the young wasp and exhibits much judgment in supplying exactly the right number to provide for the growing wasp until he is able to sally forth and seize prey for himself. These spiders—often seventeen or eighteen of them—are stupefied in the same manner as in the case of the potter wasp, and are living when the young wasp begins his repast. This habit is peculiar to many

species of wasp and is, I think, worthy of careful study. I wish I had space to tell of the almost fiendish ingenuity that certain parasites show in maintaining themselves at the expense of their hosts.

The ground hog has a knack of spending his winter in a way that is at once economical and pleasant. They generally hibernate in pairs, rolling themselves up into balls. They do not seem to breathe or to perform any of the life functions during their long six months' sleep. There is, I fear, no foundation of fact for the ancient fiction of the ground hog appearing and making weather prognostications on the second of February. A gentleman writing in the *New York Sun* of some years since says: "I took the trouble once to dig into a woodchuck's burrow on Candlemas day, and a warm, cloudy day it was; just such a day when the ground hog is said to come out of his hole and stay out. I found two woodchucks in the burrow, with no more signs of life about them than if they had been shot and killed. From all outward appearances I could have taken them out and had a game of football with them without their knowing it."

Nor is it true that hibernating animals live upon their accumulated fat, for digestion, as well as other active life processes, ceases. Hibernating animals always begin their long sleep upon an empty stomach, and food injected into their stomach is not digested. The fat disappears, it is true, but it is not in any strict sense digested. Any experienced hunter is aware that unless the entrails are removed from the shot rabbit the fat will disappear from about the kidneys. The fat may, and no doubt does, assist in some way in the long sleep. It may act as fuel to keep up the right living temperature. At any rate, it is true that hibernating animals eat voraciously and grow very fat just before they go to sleep. It is a peculiar fact that many hibernating animals bring forth their young during this period. This is especially true of woodchucks and bears. It is a common experience with hunters that only male bears are killed during the winter season.

Mr. Andrew Fuller of Ridgewood, New Jersey, according to the article above quoted, had an interesting experi-

ence with a pair of Rocky Mountain ground squirrels. After missing them for a month he accidentally found them curled up under some straw, apparently frozen stiff. He brought them to the house to show his wife their misfortune that had befallen his pets. Soon they seemed to thaw out and scampered about as lively as ever. No sooner were they put out in the cold than they resumed their sleep, which continued all winter, their bodies maintaining a fairly constant temperature, seldom falling below three degrees above the freezing point of water. They came out in the spring as chipper as if they had been asleep but one night. Many hibernating animals will if awakened by being placed in a warm room, eat eagerly, but they soon show a desire to resume their nap.

The Loir, a peculiar little native of Senegal, never hibernates in its native clime, but every specimen brought to Europe becomes torpid when exposed to cold. The common land tortoise—wherever he may be and he is a voracious eater of almost anything—always goes to sleep in November, and wakes some time in May.

Just as in the north numerous animals hibernate upon approach of cold, so in the south there are species that may be said to estivate during the hottest weather. While the northern animals curl up so as to retain heat, his southern cousin straightens out as much as possible to allow the heat to escape from all parts of the body.

But it was not my intention to write an essay upon hibernation and allied phenomena, but merely to speak of it as a subject that should be investigated. What a splendid arrangement it would be for the poor, the sick, and the melancholy folk if they could just hibernate for six months occasionally.

I will merely speak of the light of the so called lightning bug, with its over ninety per centum efficiency and no heat and no consumption of fuel to speak of. Why doesn't some genius learn her language and find out how she does it? She has been trying for centuries to demonstrate it but we are too stupid to learn her secret.

Rowland Watts.

THE GREAT-TAILED GRACKLE.

(*Quiscalus macrourus*.)

The Great-tailed Grackle belongs to a family of birds that is "eminently characteristic of the New World, all the species being peculiar to America." It is the family of the blackbird and oriole, of the bobolink and the meadowlark. It is called the Icteridae, from a Greek word *ikteros*, meaning a yellow bird. The majority of the one hundred and fifty or more species that are grouped in this family make their home in the tropics where their brilliant colors are emphasized by the ever green foliage and the bright sunshine.

The family is interesting because the species, though closely related, vary so widely in their habits. They "are found living in ground of every nature, from dry plains and wet marshes to the densest forest growth." Here are classed some of the birds which are among the most beautiful of our songsters. Here, too, are classed some species that never utter a musical sound, and whose voices are

harsh and rough. The sexes are usually dissimilar, the female being the smaller and generally much duller in color.

The Great-tailed Grackle is a native of Eastern Texas, and the country southward into Central America. The Grackles are sometimes called Crow Blackbirds. There are five species, all found in the United States, The Bronzed and the Purple Grackles are the most generally distributed and best known.

The Great-tailed Grackle, as well as the other species, usually builds rude and bulky nests in trees, sometimes at quite a height from the ground. It will also nest in shrubs and it is said that it will occasionally select holes in large trees. The males are an iridescent black in color and the females are brown and much smaller. Both sexes spend most of their time on the ground. Their feet are strong and large, and, when upon the ground, they walk or run and never hop.

THE EAGLE.

He clasps the crag with hooked hands;
Close to the sun in lonely lands,
Ring'd with the azure world, he stands.

The wrinkled sea beneath him crawls;
He watches from his mountain walls,
And like a thunderbolt he falls.

—Alfred Tennyson.



FROM COL. CH. ACAD. SCIENCES.

GREAT-TAILED GRACKLE.
(*Quiscalus macrourus*.)
 $\frac{1}{2}$ Life-size.

COPYRIGHT 1911, BY
A. W. MUNFORD, CHICAGO.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

THE GEOGRAPHICAL DISTRIBUTION OF BIRDS.

What do we mean by the "Geographical Distribution" of birds? Are not birds to be found everywhere, over both land and sea? Are they not, then, universally distributed? As a class they certainly are, but not as species nor even orders. Parrots are not found in frigid regions, nor are snowflakes and snowy owls found in the tropical regions. Our Wood Warblers and Vireos are not found outside of America, while there are no birds of Paradise anywhere in America. We shall see that most of the birds found in the eastern hemisphere differ from those found in the western, speaking broadly, but that many of the island birds are different from birds of continents.

Since most birds migrate shorter or longer distances in search of a place to rear their young, and return again to warmer regions to pass the winter months, the question at once arises, What is the geographical distribution of such migratory birds? That is not so difficult as it may seem at first glance. We have only to inquire what governs the movements of the species in question in such a way that its appearance at certain places at certain known times may be confidently expected. The study of migration and breeding has shown that the impulse to move northward in the spring to the old nesting-places where the young are reared is more reliable than the impulse to move southward on the approach of cold. The birds are more certain to appear at their old summer homes in spring than they are to be found at any particular place during the winter. But if there be any objection to this view it will yet remain true that where a bird rears its young should more properly be called its home than the place to which it is forced by the approach of cold or the lack of food. In either case, therefore, we may regard the home of the bird, and therefore treat its distribution geographically as the place where it habitually rears its young. Having settled the question as

to what shall determine the distribution of the separate species, it remains to study the physical conditions of the earth for the sake of finding what it is that determines the limits to which the different species may go.

We know that the distribution of land and water over the earth has not always been the same as it is now, but that many places that are now covered with water were once dry land, and that in many places where there is now land there used to be water. Now, America is wholly separated from Uro-Asia-Africa, but once they were connected together by a broad neck of land where Bering Sea now lies, and there may have been another neck of land connecting Europe with Iceland and Greenland and so with North America. Now Australia and New Zealand are wholly separated from all other lands, but they were not so long ago. So of the larger islands in general, they have not always been isolated as now, but connected with great land masses, sharing with them the animals which roamed over the whole vast regions. For in the earlier times before Man had appeared upon the earth, before the great Glacial Period, the whole earth was tropical in climate, making it possible for plants as well as animals to live anywhere upon the earth, as they cannot now. Then extensive migrations north and south were not necessary, but instead there were roamings about in all directions, or great invasions of new regions by hosts of animals of one kind.

As the land sank away here and there, and the sea covered it, barriers were thus formed to further roamings, except by the birds of strong flight or animals that could swim long distances, and there could no longer be an intermingling of the animals of the whole land surface of the world. Since all animals are inclined to change somewhat to meet or keep pace with the changes that are going on in vegetation and the general physical

conditions of the earth, those that have been separated in this way will grow more and more unlike. In some such isolated regions there may not be much change in their environment and so they will change but little, if at all, and so will not keep pace with those in other regions where life is a constant struggle with others for supremacy. It is just as true in the natural world as in the commercial, that competition is necessary for the highest development. It is probably true that the disturbances which caused the land to sink in places and so disconnect what had been connected lands, possibly a splitting up of one great flat land mass, also brought about the changes which made out of one great tropical world the one that we know with its frigid, temperate and tropical zones. So that just at the time when the animals of the different regions were separated from each other forever there came these changes in physical conditions which would make them change to meet the new conditions. But that is a long story for the geologist to tell. Of course the sinking of the land in different regions occurred at different times, probably thousands of years apart in many cases. And the changes from tropical to temperate and frigid must have been very gradual also, or there would have been no animals left alive in the northern and southern regions. Only those near the equator could have lived.

Probably New Zealand was the first considerable land mass to be separated absolutely and for all time from all other land, because here we find the lowest type of birds and lower animals. There are no terrestrial indigenous mammals even. Such birds as were not able to fly across the now wide stretches of ocean did not continue to develop rapidly because there was little change in their environment and because there was little or no competition with other similar forms. So to-day we find them either very similar to what they were when their island home was made an island home, or else even degenerated into flightless creatures. Australia seems to have been the next tract of land cut off, for here, too, we meet with the lower forms which show the lack of the keen competition

which their relatives further north had to sustain. When North America was cut off from Siberia, marking the close of more or less extensive interchange of communication of the animals of both regions, there was little difference in their animal life; but following this separation there came about a more rapid change in the Orient than in the Occident. It may not be quite clear why this was so, but that it was cannot be doubted, for some of the lower forms of animals which still inhabit America have been completely destroyed in the Orient. At the time of their separation these forms were found in both places. What seems a probable explanation of this more rapid change in the Orient may be briefly stated. The configuration of the Orient is such that animals would have a far greater range east and west than north and south. A great mountain range and a great desert are thrown as barriers across the way of the northward and southward movement. In America there is a continuous gateway to the north and south, but barriers to an eastward or westward movement. With such creatures as the birds freedom to move north and south would always lessen competition, while the crowding of one group or race upon another eastward or westward would increase the competition. But Geology tells us that in the Orient such westward invasions have actually occurred, causing the death of the less hardy forms and the modification of all forms of animal life.

It must not be understood, from what has been said, that all the animals, especially the birds, found in any one country or island, are different from the birds found in all others, for that is not true. There are many species of birds that are found practically all over the earth. But what is true is that each country or region of any considerable extent, or group of oceanic islands has some species which are not found anywhere else in the world.

From what has already been said it will be clear that the world may be divided into several different regions, according to the animals which are peculiar to the different ones. Following Newton's system, because it seems the most logi-

cal, at least so far as the birds are concerned, we have first

THE NEW ZEALAND REGION.

Here we find the flightless Apteryx and a flightless goose now extinct, also the extinct Moa. There are also peculiar forms among the shore-birds, the birds of prey, the parrots, and some rather curiously constituted passerine birds. There have been several species introduced in relatively recent times, some of which already show signs of change.

THE AUSTRALIAN REGION

is but slightly connected with the preceding. The line separating this region from the Indian passes between the islands of Bali and Lombok, through the Strait of Macassar, between Borneo and Celebes, thence northward between the Philippines and Sanguir and Pelew; including, further on, the Ladrones, Hawaiians, all of Polynesia except the northern outliers of the New Zealand group, and finally sweeping back to encompass Australia. Here we find the curious egg-laying mammal, Ornithorhynchus. But to pass at once to the birds. Here we find such peculiar forms as the megapodes, cassowaries, sun-bitterns, birds-of-paradise, lyre-birds, and many not so familiar. Of the higher birds there are but few compared with Europe or America. It is evidently a continent which has long been separated from the rest of the world.

THE NEOTROPICAL REGION

includes, broadly, tropical America. The forms found here bear certain resemblances to those found in the two regions already discussed; but this resemblance is probably rather because they are low in the scale of development than that there has ever been any direct land connection between them. Much the same conditions of life must have prevailed for all, thus making the rate of development nearly equal. Here we find the rhea, tinamou and hoactzin, which show low grade; but mingling freely with them the higher forms which seem to have come down from the north later and all but crowded out these lower ones. There is abundant evidence that the struggle for existence in South America has been far less severe than in North America.

THE HOLARCTIC REGION,

as the name implies, includes all of North America, Europe, Asia north of India, and the Himalaya mountains, northern Africa where the great Sahara forms the natural boundary, and all islands belonging to the north temperate and north frigid zones. Many have divided this great belt into Palearctic and Nearctic, but the intermingling of species between northeast Siberia and Alaska seems to make such a distinction impracticable. But these distinctions should be and are retained in the divisions of the Holarctic. When we understand that at least one-third of the species found in the Nearctic are also found in the Palearctic, we shall understand why these two are grouped under one region. There are no orders, and there seem to be no families which are found in the Holarctic and nowhere else. Indeed, it is difficult to find even genera which do not have some species ranging into the Neotropical, Ethiopian or Indian. But among the species we find many. Indeed, there are few species which nest in both the Holarctic and in the regions bounding it on the south, and many of these are found only on the southern boundaries of the Holarctic. In our part of the Holarctic, that is, the Nearctic, the familiar birds about us do not nest also in the tropical regions.

THE ETHIOPIAN REGION,

as the name suggests, includes the whole of Africa except that portion north of the Sahara desert, and Arabia and Egypt, with Madagascar and other islands in the immediate vicinity. It seems hardly necessary to even mention the forms that are peculiar to this peculiar region. Even the word Africa brings trooping to our minds a whole continent of peculiarities in more realms than one. Here we find the Ostrich, the plantain eaters, the colies and several other families—nine in all. Of the lower groups there are the rollers, bee-eaters, horn-bills, the curious secretary-bird and many others. It is significant that among the Passerine birds there are but three families that are peculiar. So on the whole, this region has not developed so rapidly as the Holarctic.

There has not been the intense struggle for supremacy here which we see in the north temperate and higher regions.

THE INDIAN REGION

completes the list. Broadly speaking, this region comprises that part of Asia which lies east of the Indus river south of the Himalaya mountains except the eastern half of the drainage basin of the Yang-tse-kiang river, reaching the coast just south of Shanghai, including the island of Formosa, the Philippines, Borneo, Java, Sumatra and Ceylon. This is the Oriental Region of Wallace. There are, apparently, but two families of birds peculiar to this region: the bulbuls and the broad-bills; but there are very many genera and species found nowhere else in the world. The king-crows, sun-birds, swallow-shrikes, argus pheasant, jungle fowl and the well-known peacocks belong here. Very many of the birds of this region are gaudily colored and striking in appearance.

Each of these great regions, except possibly New Zealand, are readily divisible into sub-regions, and these again into areas of lesser extent, until each fauna may be assigned its proper place. Thus in the Holarctic Region we recognize the Nearctic, which comprises about all of North America, and a Palearctic sub-region, the outlines of which have already been sketched. Within the Nearctic three minor regions are recognized. The Arctic "includes that part of the continent and its adjacent islands north of about the limit of forest vegetation" (Allen). That is, extreme northern and north-western Alaska, sweeping southeasterly through British America to and including Hudson Bay, northern and north-eastern Labrador and northern Newfoundland. The Cold Temperate, which lies next south, begins in the east near Quebec, then sweeps westward past the Great Lakes almost to Winnipeg, thence in a northwesterly direction just west of

Lake Winnipeg; from there in a more westerly direction to the mountains, which it follows even into northern Mexico as a narrow line; from the west coast at the north end of Vancouver Island it runs east to the mountains. Maine and Nova Scotia are a part of the Allegheny belt which reaches to Alabama. Below this southern limit of the Cold Temperate lies the Warm Temperate, extending almost to Central America. But this is again subdivided into an eastern Humid Province which ends at the Plains, and a western Arid Province. These are again subdivided into an Appalachian Subprovince and an Austroriparian Subprovince for the Humid Province, and a Sonoran and Campestrian Subprovince for the Arid Province. But the boundaries of these minor subdivisions are not yet definitely settled, nor are the characteristic species in each finally decided upon, so it will not be profitable to carry our investigation further at this time.

We learn from this that when we find that one region, be it large or small, is unlike every other region in some particulars of climate or vegetation or temperature, or when it is not easily accessible from other regions, we may expect to find the animals somewhat different according to the conditions which prevail. From this it is a clear step to the truth that an animal's environment exerts a considerable influence upon its life and through its life upon its form; changing the form in some particulars that make it different from all other animals. It is also true of plants. Since, then, there are different physical conditions in every country of any considerable size, these changes in plants and animals are going on now, but so slowly that we are not able to see them. At the end of another thousand years or longer, the species of birds which we now know may be so changed that we should not know them if we could see them. But that need not worry us!

Lynds Jones.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



THE HOODED WARBLER.

(*Sylvania mitrata*.)

"He was recognizable at once by the bright yellow hood he wore, bordered all around with deep black. A bright, flitting blossom of the bird world!"—*Leander S. Keyser, in Bird Land.*

This beautiful little warbler is a resident of the eastern United States. It is more common in the southern portion of this district and throughout the Mississippi Valley. Its breeding range extends from the Gulf of Mexico as far to the northward as southern Michigan. It winters in the West Indies, in Mexico, and in Central America. Though a wood warbler it prefers the shrubby growths in low and well-watered places rather than the forest. It is said to be abundant among the canes of the Southern States. Many other names have been given this warbler, all having reference to the arrangement of the black and yellow colors on the head. It is called the Black-headed Warbler, the Hooded Flycatching Warbler, the Mitred Warbler, and the Black-cap Warbler.

Activity seems to be the keynote of its life. It is in constant pursuit of insects, which it catches while they are on the wing. Unlike the flycatchers it seldom returns to the same perch from which it flew to catch its prey.

The words of Mr. Keyser most aptly describe the habits of the Hooded Warbler. He says, speaking of an hour spent in observing the bird's behavior, "He was not in the least shy or nervous, but seemed rather to court my presence. Almost every moment was spent in capturing insects on the wing or in sitting on a perch watching for them to flash into view. Like a genuine flycatcher, as soon as a buzzing insect hove in sight, he would dart out after it, and never once failed to secure his prize. Sometimes he would plunge swiftly downward after a

gnat or miller, and once, having caught a miller that was large and inclined to be refractory, he flew to the ground, beat it awhile on the clods, and then swallowed it with a consequential air which seemed to say, 'That is my way of disposing of such cases!' Several times he mounted almost straight up from his perch, and twice he almost turned a somersault in pursuit of an insect. Once he clung like a titmouse to the bole of a sapling."

To some its notes, which are quite musical, lively, sweet and happy, seem to resemble twee, twee, twitchie. Mr. Chapman says the song "is subject to much variation, but as a rule consists of eight or nine notes. To my ear the bird seems to say, 'You must come to the woods, or you won't see me.'"

The nest of the Hooded Warbler is usually built in low shrubs, sometimes but a few inches from the ground and seldom higher than two feet. It is constructed of fine rootlets, and fibers of bark compactly interwoven with leaves, fine grass and hair. It is lined with grass, hair and feathers. The eggs, which are usually five in number, are white, or nearly white, in color, with red or brownish spots near the larger end. They are nearly three-fourths of an inch in length, and a little over one-half of an inch in their greatest diameter.

Three years or more are required for the development of the fully adult plumage. The throat of the female, though black, is not as pure a black as that of the male, and it is not so extensive or as well defined.

MRS. JANE'S EXPERIMENT.

One is surprised at the wonderful vitality to be found in an egg. The following incident, almost incredible as it seems, is an absolute fact.

Mrs. Jane, very fond of raising select breeds of chickens, put a setting of fine Brahma eggs under what she considered an absolutely trustworthy Biddy,—but, alas! Biddy proved unstable, like many another biped, and went off in a few days, leaving her nest and rather costly contents to the mercy of the elements.

Mrs. Jane, in three or four days, discovered the abandoned domicile, and, determined not to be outdone by any such maneuver on the part of Biddy, proposed to show her that Brahma chickens could be developed without the assistance of any old hen.

So, not having an incubator of any approved manufacture, she proceeded to make one. She secured a large bread pan to hold the water, a small wooden pail to hold the eggs, which were wrapped in warm flannel, and a good kerosene lamp, which was placed under the pan holding the water and then lighted.

The bucket containing the eggs was then placed in the pan of water and the whole apparatus left in a quiet bedroom.

Oh, how Mr. Jane and the boys and the neighbors twitted Mrs. Jane about wasting coal oil and time in keeping those eggs warm! But, behold! in a little over two weeks, one morning a shell was chipped, at noon another, and by the next

morning four pert little downy fellows occupied the bottom of the bucket, with seven unhatched eggs.

Those chickens grew faster than almost any chickens ever known. They were never anything but tame, and the most active of the four, who bears the appropriate name of Theodore Roosevelt, allows any one to pick him up and fondle him, but is ready to fight with anything in the poultry yard—big chicken, little chicken, the skye terrier, the cat or anything else that is or might be in his way. Mrs. Jane says she never was sorry for her experiment but once, and that is all the time.

The cause for Mrs. Jane's regret is the fact that whether she be in the hen yard, kitchen or parlor, no place except right under her motherly gown is quite good enough for these enterprising birds.

Recently I saw "Teddy" open the screen and walk into the kitchen.

He lifted his foot, pulled the screen open wide enough to admit his head and then pushed his whole body, now quite large and plump, through the crack.

How long this interesting little hero, with his mates, will be permitted to enjoy the rights of chickendom yet remains to be seen, but the fact that "Mrs. Jane's incubator was a success" has been admitted by all who were so skeptical when she began her novel experiment.

Mary Noland.

A STROLL IN THE FROST KING'S REALM.

The rain of the night before had turned into a heavy sleet, followed by blustering weather. All day the sun was hidden by gray clouds, accompanied with fitful snow showers; but at last the clouds were dispelled and the following morning dawned clear and cold.

As the sun slowly rose above the horizon he added dazzling brilliance to the already lovely landscape.

The mercury was very little above zero as I sought the woods to reap the full benefit of this wonderful transformation of Nature. Just two days ago she wore her usual garb of neutral tints; but what a magical change the Frost King had wrought in this time! The earth was now covered with a white mantle of snow and every tree and shrub had on a glittering armor of sleet. A few minutes' brisk walk over the crisp snow brought me to a corn field, and by wending my way along a path through this field I arrived at a strip of woodland. Here the path merged into a narrow wagon road cut out of a steep bluff. The entrance to this road introduced me to a land of enchantment.

On either side the face of the bluff was covered with a tangled growth of shrubs, briars and weeds, while above were trees whose over-arching branches sparkled in the sun, showing all the colors of the rainbow. Every branch and twig was decked with gems—rubies, sapphires, emeralds and diamonds everywhere—and diamond dust formed a carpet underneath. The low bushes at the base of the bank where sheltered from the wind's disarranging blast, were wrapped in finest ermine. Just in front of me, to the left, was a wild rose, a fountain of purest crystal, the effect heightened by its scarlet hips. A little further on was a small tree draped with a tangled vine with clusters of pendant fruit, like crystallized grapes. On the other hand were raspberry canes, the livid red gleaming through the dazzling frost, and all around was goldenrod, more resplendent than when its golden blossoms lighted the way in autumn, and the asters shone like jewel-rayed stars.

A barbed-wire fence, as far as the eye could reach, was converted into endless strings of pearls. I gazed upon this vision until, becoming dazzled, I turned from the sun to rest my eyes, and in the background saw trees that formed pearly silhouettes against the dark blue sky. Was any enchanted land more entrancing?

Turning again, I resumed my walk to the foot of the hill, and, by the aid of the bushes and saplings, scrambled up its precipitous face and pushed onward through the underbrush, parting the interlacing branches as I went until I reached a ravine.

I continued onward, recognizing the familiar trees everywhere; though divested of foliage and incased in crystal, each variety has its distinctive form and bark. A musical tinkle accompanied every movement as I brushed the twigs and grasses along the way.

One not accustomed to the study of Nature in her various moods might suppose that such a landscape would be devoid of animation. But this was not the case. A very pleasing feature of the scene was the animal life that abounded. A rabbit snugly concealed beneath a bunch of grass started up, bounded away, and was soon lost to view in the thicket. Small flocks of snowbirds and chickadees were flitting gaily about. A crow sat in the top of a majestic oak and cawed lustily in answer to one that was faintly heard in the distance. A pair of cardinals flew about the border of the woods, and a single woodpecker was high up on the trunk of a tree, while another, whose form could not be detected, was hammering away. All these were suited to the environment, but not so was yonder lone blackbird, doubtless a straggler from a flock which had settled in the tree of the yard in the early morning.

Lured by the pleasant, mild weather of the preceding week, they had arrived only to encounter snow and mid-winter, and would doubtless retreat to more congenial surroundings and absent themselves until the true springtime should herald the approach of summer.

Addie L. Booker.

SNAILS OF THE FOREST AND FIELD.

The forest is the home of the snail, where these interesting little animals may be found by any one desiring a closer acquaintance. They are not generally easy to find, being mostly nocturnal in habits and remaining hidden away under leaves, stones and old logs during the daytime. On rainy days, however, they may be seen crawling about, enjoying the delicious moisture.

In our last article we reviewed a few of the most interesting families of bivalve shells, and in the present paper we desire to draw the attention of the reader to the order Pulmonata, which includes those snails breathing air by means of a modified lung. The snails differ from the clams in having the body generally protected by a spiral shell which is capable of containing the entire animal. The former have a more or less expanded creeping disk which we call a foot, a head generally separated from the body by a neck (the reader will remember that the clams are headless), and also a pair of rather long eye peduncles protruding from the top of the head, which bear at their tips the round, black eyes, and a pair of short tactile organs, or tentacles, extending from the lower part of the head. The eye-peduncles are peculiar in being invertible in the same manner that a kid glove finger is pulled inside out.

The mouth is placed in the lower plane of the head and is recognized externally as a simple slit. Inside of the mouth is placed one of the most wonderful dental apparatuses known to science. This is called the radula, odontophore or tooth-bearer, and is a belt of chitinous, transparent, yellowish or colorless material, its upper surface being armed with numerous siliceous teeth arranged in longitudinal and parallel rows. The radula is placed in an organ called the buccal sac and occupies a position in the sac analogous to that of the tongue in a cat or dog, viz., on the floor of the mouth. It is

formed from a layer of cells in the posterior part of the buccal sac, called the radula sac, and new teeth are constantly forming here to take the place of those which have become worn by use. The whole radula rests upon a cartilage, is strongly fastened at the anterior end, and is brought down between the two fleshy lips of the mouth where it performs a backward and forward movement, thus rasping off with the sharp teeth particles of food which have been cut into small pieces by the horny jaw. During this process the morsel of food is pressed against the top or roof of the mouth. The jaw is placed in the upper part of the mouth in front of the radula, and is frequently armed with ribs to aid in cutting or biting off pieces of food, as leaves or vegetables.

As before remarked, the radula is made up of parallel rows of teeth, the whole area being usually divided into five longitudinal rows, each row differing from the one next to it. We have first a central row, on each side of this a lateral row and finally a marginal row. Each tooth in each row is made up of different parts, a basal part attached to the radula belt and an upper part which is turned over or reflexed and bent backward so as to tear off food particles by a backward movement of the whole apparatus. This diversity of form in the teeth has led conchologists to adopt a tooth formula similar to that adopted for vertebrate animals, so that the teeth of different species can be compared and the animals classified thereby. Thus each tooth has certain prominences called cusps, which vary in size, number and position, and serve admirably to describe the different groups of snails. All the mollusca, except the bivalves, are provided with this radula.

One of the most wonderful and interesting facts connected with the radula is the large number of teeth on each mem-



FROM COL. CHI. ACAD. SCIENCES.

389

LAND SHELLS.

COPYRIGHT 1901, BY
A. W. MUMFORD, CHICAGO.

Helix fidelis (California)
Cyclophorus appendiculatus (Philippines)
Helix albolabris (U. S.)
Helix profunda (U. S.)
Zonites fuliginosus (U. S.)
Cerion microstoma (Cuba)

Clausilia macarana (Dalmatia)

Helix pomatia (Europe)

Helix haemastoma (India)
Nanina lamarkiana (Philippines)
Vehatinella (Sandwich Islands)

Bulinulus multilineatus (Florida)

Liguus fasciatus (Florida)
Bulinus chiliensis (South America)

Glandina truncata (Florida)
Helix intorta (Philippines)
Helix nemoralis (Europe)

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

brane. Thus in some species of our common snails there are seventy-one teeth in a single row, and the whole radula is made up of a hundred rows of teeth, making a grand total of seventy-one hundred teeth in the mouth of a single snail!

Land snails are found almost everywhere, in valleys, high up on mountains, and even in deserts. They may be found in the cold climate of Alaska or in the tropical zone under the equator. As a rule, they prefer moist localities, where there is an abundance of vegetation and where the ground is strewn with rotting logs, beds of decaying leaves or moss-covered rocks. Open woodlands may be said to be their best habitat in the northern part of the United States.

The shells of the Pulmonata vary to a wonderful degree in size, shape and coloration. Some are so small that they can scarcely be seen with the unaided eye, while others attain a length of six inches; some have the aperture of the shell armed with numerous folds or teeth, while others are smooth and the colors vary from whitish or horn-colored to the gorgeously colored helices of the tropics with their bands and blotches of red, brown, white or green. With all this diversity the land shells or helices may always be distinguished from their salt or fresh-water relatives. The land snails breathe by means of a so-called lung which is a sac lined with a network of blood vessels and occupying the last turn or whorl of the shell. The air taken into this lung purifies the blood.

Much is written at the present time upon our new possessions, the Philippine Islands, but few people are aware that these islands are tenanted by the most interesting and beautiful group of all the land shells, the Cochlostylas, or tree snails. The animals live for the most part in the trees and bushes of the islands, the island of Luzon having, probably, the best known fauna. The animals are large and quite bold and the shells are of surpassing beauty, with their colors of white, green, brown, etc. Now that these islands have come into the possession of the United States it is to be hoped that these handsome creatures will receive the study they deserve.

The land shells of the United States,

while numerous in species, are not as conspicuous in color-pattern as those of Europe, South America or the islands of the Indian and Pacific Oceans, although California produces some highly-colored species, as will be seen by consulting the figure of *Helix fidelis*, on our plate. The majority of our species are uncolored, like the figure of *Polygyra albolabris*.

One of the largest and most interesting of American shells is the *Bulimus*, found in South America. The shell of *Bulimus ovatus* attains a length of six inches and the animal is correspondingly large. In the markets of Rio Janeiro this mollusk is sold as food and is eagerly sought by the poorer people, among whom it is considered a great delicacy. Another interesting fact in connection with this species (as well as others of the genus) is the size of the eggs which it deposits, they being as large as pigeons' eggs. These are also eaten with avidity by the negroes of Brazil.

One of the most beautiful of the land shells found in the United States is the *Liguus fasciatus*, found in Florida and Cuba. The shell is about two inches long and is encircled by bands of white, brown and green. This species lives in great numbers at Key West, associated with many small shells of the *Bulimus* group. Closely related to the last-mentioned shell (*Liguus*) is the agate shell (*Achatina*), which attains a length of seven inches and is the largest of the land shells. Like the *Bulimus* mentioned above it lays eggs of large size with a calcareous shell, some being over an inch in length. Both the animal and the egg are eaten by the natives of Africa. The shells are very attractive, being variegated with different colors, like agate, from which they receive their common name.

Another of our new political possessions, the Hawaiian Islands, has a molluscan fauna peculiar to itself. This is the family Achatinellidae which is confined solely to the Sandwich Islands. There are no shells which can compare in beauty with the *Achatinella* with their encircled bands of black, yellow, white, red, etc. They live on the bushes, generally rather low and near the ground, and recently they have been threatened with

extinction because of the cattle which have been introduced into the islands. In feeding on the bushes, they also consume large quantities of these snails. A bush inhabited by these little creatures must be a beautiful sight, with the green foliage set off by the handsomely colored shells, like jewels on a costly dress.

Among the edible snails none excel in public favor the common edible snail of Europe (*Helix pomatia*). The cultivation of this animal has become an established business, like our oyster fisheries, and thousands are consumed annually. The early Romans considered this animal a dainty dish, and the inhabitants of France, Spain and Italy have inherited or cultivated a liking for the succulent "Shell-fish." This species has been introduced into New Orleans where it is eaten by the French inhabitants. *Helix nemoralis*, an edible snail of England, with a beautifully banded shell, is sold in the streets of London and eaten much as we eat walnuts, by picking out the animal with a pin! The edible snails, as well as many others, make good and interesting pets in captivity, the *Helix pomatia* being of such a size that it may be easily studied. It is interesting to watch one of these snails feeding upon a piece of lettuce. First the jaw is seen to protrude and to cut off a small piece of the leaf, which is drawn into the mouth and reduced to still smaller pieces by the rasp-like radula. A large piece of lettuce, after this snail has made a meal upon it, looks as if an army of worms had been at work. The *pomatia* is also of an inquisitive disposition and will wander about the snailery (or even the whole house if he can get out), examining everything in a very curious manner. No more interesting object can be placed in a library or study than a snailery with several species of snails. They are far superior in interest to goldfish or canaries.

The most interesting snails are by no means the largest. Frequently the small snail shells with their animals have habits or shell structures of absorbing interest. Among these are the Pupae, whose tiny shells frequently reach the astounding size of one-sixteenth of an inch in length! It is not until we place these mites under the microscope that their interesting

characters are seen and appreciated. By such an examination we find that the little apertures are armed with many teeth and folds, and sometimes we wonder how it is that the animal ever gets in and out through such a labyrinth of apparent obstructions. These teeth serve in a manner to protect the little animal from its enemies. These tiny shells are always to be found plentifully under starting bark and under chips, stones and debris, in more or less moist localities.

In another genus of Pupidae, *Clausilia*, nature has provided the aperture of the shell with a little valve called a "clausilium," which acts as a spring door to close the shell against all its enemies. This door is an additional safeguard as the aperture is already provided with numerous teeth and folds. In this manner does Mother Nature look after her children.

It is a curious fact that in all the larger groups of animals there are one or more genera which have the cruel and blood-thirsty propensities of the shark. The Mollusca are no exception to this rule, and we find in the genus *Testacella* an animal having all the ferocious propensities of the terrible man-eating tiger. This mollusk has a long, worm-like body, the shell being very small and rudimentary, ear shaped, and placed on the extreme posterior end of the animal. Its principal food consists of earth-worms, although it will attack other mollusks and even its own species. It has been likened to the tiger and the shark in its cunning while pursuing its prey and in its ferocity when attacking it. The poor earth-worm stands but a slight chance of escape when *Testacella* scents it and starts in pursuit. The worm tries to escape by retreating into its underground galleries, but this is of no avail because the mollusk has a long, narrow body and can go wherever the worm does. If the worm, perchance, has the opportunity of retreating far into its galleries, the mollusk will dig tunnels to intercept it. Frequently the mollusk will make a sudden spring upon its victim, taking it by surprise. This slug-like snail will frequently devour a snail much larger than itself, but if the victim is too large for one meal it will be broken in the middle and one half eaten and di-

gested and then the meal completed with the other half.

The Testacella also resembles the tiger and the shark in the possession of long, fang-like teeth upon its radula. These teeth are recurved and aid the mollusk in getting a firm hold upon its victim, and also assist in the operation of swallowing. It is a curious fact that this animal will not feed upon other dead animals nor upon fresh meat, nor freshly-killed worms. Like the snake, which it greatly resembles in habits, it must hunt and kill its own food. Its wanderings are nocturnal and during the day it remains concealed, buried in the earth. Testacella is quite long lived, as snails go, its duration of life being about six years.

A genus allied to Testacella, and having the same predaceous habits, but being protected by a large shell into which the whole animal can withdraw, is the *Oleacina* or *Glandina*. The shell is long, with a narrow aperture and a dome-shaped spire; the animal is long and narrow and the head near the mouth is furnished with a pair of elongated lips which may be used as tentacles. The South American species feed on the larger mollusks, as the *Bulimus* before spoken of, and the aperture of each intended victim's shell is carefully examined before any attempt is made to enter. When our "tiger" is satisfied that its victim is really within, it will enter the aperture and devour the animal. Sometimes it will make a hole for itself in the shell of its victim and will eat the contents through this aperture instead of the natural one. In Florida these animals prey upon the large pulmonates like *Lignus* and *Orthalicus*.

Before closing this brief sketch of the Land Mollusks we must not neglect to mention their wonderful protection against the cold of winter and the heat of

summer. This is a tough, leathery secretion, which completely covers the aperture, and its formation is thus described by Mr. W. G. Binney in his "Manual of American Land Shells."

"Withdrawing into the shell, it forms over the aperture a membraneous covering, consisting of a thin, semi-transparent mixture of lime, mucus or gelatine, secreted from the collar of the animal. This membrane is called the epiphragm. It is formed in this manner: The animal being withdrawn into the shell, the collar is brought to a level with the aperture, and a quantity of mucus is poured out from it and covers it. A small quantity of air is then emitted from the respiratory foramen, which detaches the mucus from the surface of the collar, and projects it in a convex form, like a bubble. At the same moment the animal retreats farther into the shell, leaving a vacuum between itself and the membrane, which is consequently pressed back by the external air to a level with the aperture, or even farther, so as to form a concave surface, where, having become desiccated and hard, it remains fixed. These operations are nearly simultaneous and occupy but an instant. As the weather becomes colder the animal retires farther into the shell, and makes another septum, and so on, until there are sometimes as many as six of these partitions."

The air-breathing snails which we have so briefly discussed in this article, are but a very limited number of the many thousand species of this very interesting group of animals. Their shells are easily gathered and require but little trouble to prepare for the cabinet and for study. The writer, therefore, trusts that what has been written may act as a stimulus and induce many to take up the collection and study of these beautiful objects.

Frank Collins Baker.

THE GILA MONSTER.

(*Heloderma suspectum*).

The reptile fauna of the North American continent includes a curious lizard known as Gila Monster, in science called *Heloderma*. It represents a family all to itself, with only two species: *Heloderma horridum* and *Heloderma suspectum*.

Francisco Hernandez, a Spanish physician and naturalist, was the first to know of its existence when he found it in Mexico in the year 1651. In an account of his explorations he mentions a lizard three feet long, with a thick-set body, covered with wart-like skin, gaudily colored in orange and black, and generally of such horrid appearance that Wiegmann, another scientist, two hundred years later, called it *Heloderma horridum*.

For a long time this name was given indiscriminately to all lizards of this kind, living either south or north of the boundary line of Mexico and the United States, till Professor Cope discovered a difference between them and called the variety found in our southwestern territories and states *Heloderma suspectum*.

Many other naturalists have since taken up the study of this interesting reptile. The result of their observations and experiments was that they all agree in acknowledging the *Heloderma* as the only poisonous lizard in existence, although their opinions are at variance as to the effect of its venom on the human system. Dr. van Denburgh in his latest researches has found two glands, one on each side of the lower jaw, located between the skin and the bone. Such a venom-producing gland being taken out of its enveloping membrane proves to be not a single body, but an agglomeration of several small ones, differing in size, and each emptying through a separate duct. These glands are not directly communicated to the teeth. When the animal is highly irritated, caused by constant teasing or rough handling or by being trodden upon, the poison is emitted by the glands, gathers

on the floor of the mouth, where it mixes with the saliva, and is transmitted through the bite.

A *Heloderma* has no fangs, but a goodly number of sharp, pointed teeth, both on the upper and lower jaws. They are curved backward and about an eighth of an inch long, or even less than that. The principal characteristic of these teeth is that they are grooved, facilitating thus the flow of the venom into the wound. It bites with an extremely swift dash, directed sideways, and holds on tenaciously to whatever is seized with its powerful jaws. Sumichrast says when the reptile bites it throws itself on its back, but none of the later naturalists makes mention of this peculiarity.

The venom of the Gila Monster injected into the veins and arteries of smaller animals as rats, cavies and rabbits and into the breast of pigeons and chickens, causes death within twenty seconds to seven minutes. Brehm relates that a young *Heloderma*, and in poor physical condition besides, was induced to bite the leg of a large, well-fed cat, which did not die, but gave signs of prolonged terrible sufferings. It became dull and emaciated and never regained its former good spirits.

Among several cases of Gila Monster bites inflicted on human beings can be quoted that of Dr. Shufeldt, who, in "The American Naturalist," gave an interesting account of the sensations he experienced. It is sufficient to say that the pain, starting from a wound on the right thumb, went like an electric shock through the whole body and was so severe as to cause the victim to faint. Immediate treatment prevented more serious consequences. The Doctor, nevertheless, was a very sick man for several days and began to recover only after a week had elapsed.

The constituents of the venom are as yet not thoroughly known, but it is said to be of an alkaline nature, the opposite

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



TAKEN FROM THE REPTILIE E. HINLEY AND FRANK M. WOODRUFF.

GILA MONSTER.
(*Heloderma suspectum*.)
About 1 1/2 ft. long.

COPYRIGHT 1901, BY
A. W. MUMFORD, CHICAGO

of snake poison, which is acid. It acts upon the heart, the spine and the nerve centers and causes paralysis.

Other scientists claim the saliva of the *Heloderma* is poisonous only in certain cases and under certain circumstances. It may also depend upon the physical condition of the victim at the time the venom enters into the system. Yet there is little doubt that, if help is not at hand immediately, the bite may prove fatal.

The Apaches stand in dire fear of this animal, so that, at least, with their older people no amount of money seems tempting enough to make them go near it, much less to capture one. A former resident of the territories says both Indians and Mexicans believe firmly that if a Gila Monster only breathes in your face it is quite sufficient to cause immediate death. On an old Indian trail, a good day's journey west from the present site of Phoenix, can be found, crudely outlined on the face of a rock, the picture of two *Helodermas* pursuing a man who runs to save his life. Numerous hieroglyphic inscriptions tell probably the story of the event and prove not only the prehistoric origin of this primitive piece of art, but also the erroneous ideas which were prevalent in these remote times, for the reptile never attacks and never pursues. It is safe to say that the animal has been vastly misrepresented at all ages.

Nature has kindly provided the *Heloderma* with a compensation for its partially undeserved bad reputation in giving it beauty. For whosoever looks upon a fine specimen with unprejudiced eyes cannot fail to admire at least the combination of its colors and especially the odd, capriciously disposed markings; the delicately tinted skin, studded in transverse rows with shiny tubercles, like so many beads on strings.

The illustration to this paper is so excellently made that scarcely any description is necessary as to the animal's exterior in color and markings. This *Heloderma* is a little over nineteen inches in length by ten inches in circumference of the body and five inches at the thickest part of the tail, which makes one-third of the total length of the body. When such a reptile grows to the size of eighteen inches it is called adult. Those growing

beyond these figures are unusually large specimens and in very rare instances the species of our illustration reaches the extraordinary length of two feet. An adult Gila Monster weighs about two or three pounds, and in winter less than in summer.

The four short and stubby legs seem quite out of proportion to the massive body, much more so as the two pairs are widely separated lengthwise of the body. When walking the body is elevated, while in rest it lies flat on the ground. Each foot is provided with five digits armed with curved white claws.

The skin has generally the appearance as if covered with rows of uniform beads; but, on closer examination, these beads, or more correctly, tubercles, prove to have different shapes and are differently set, according to the part of the body which they cover. On the head from the nose up to between the eyes they are flat, irregularly cut, closely joined and adhere completely to the skull. Those following form polygonal eminences, each one separated from the other by a circle of tiny dermal granulations, while behind the eyes on both sides of the head they are larger, semi-spherical and stand far apart. The throat and the nape of the neck are studded with very closely set small tubercles, increasing in size only above the forelegs, whence they extend in well-defined, transverse rows along the whole upper side of the body and the tail. The under side of the latter and the abdomen are covered with tessellated scales of a light-brown and dull yellow color arranged in another handsome pattern.

A *Heloderma's* head, with its triangular shape, is very like that of a venomous snake; it gives the animal—especially when it is raised in anger—a truly awe-inspiring appearance.

The wide-cleft mouth reaches far behind the eyes. These are very small and, like all lizards, provided with eye-lids that close when the animal sleeps. The eye itself has a dark-brown iris, with the round pupil that indicates diurnal or at least semi-nocturnal habits. Between the nostrils, well in front of the blunt nose, is a wide space. The nostrils are so far down as to nearly touch the margin of the supra-labial scales. This position denotes

terrestrial habits in reptiles rather than an all aquatic life. For to most of them water is indispensable to their welfare. Thus the Gila Monster shows this structure as it likes to bathe in shallow water, often for many hours at a time.

The crescent-shaped openings of the ears are situated not far from the edge of the mouth, between the head and the neck, and are partly concealed and also protected by the overlapping gular fold; the tympanum is exposed. The animal sees and hears well. The remaining three senses are more or less concentrated in the tongue which is one of the most remarkable features of the *Heloderma*. It is slightly forked at the tips, half an inch wide and two to three inches long; it is dark reddish-brown with a shade of purple. When in rest it is drawn together into a small, conical shaped mass, scarcely an inch in length. But as soon as something disturbs the usual quietude of the animal the tongue is thrown out immediately. In fact, it is used for smelling, tasting, feeling. It is used for measuring depth and distance, for expressing desire and satisfaction; and with what rapidity is this instrument of communication projected and retracted!

A Gila Monster may be trusted to some extent as long as the tongue is freely used, but if that is not the case it is wise to be careful in handling it. Fear and hostility are expressed by deep, long-drawn hisses; by opening the mouth to its fullest extent and by quick jerks of the head from one side to the other.

At the present time these reptiles are not so very common. Ever-prevailing superstition among the ignorant and exaggerated bad reputation have brought on a relentless war of extermination against them, so that now in the neighborhood of settlements they are seen seldom if ever. Their center of distribution is more and more confined to the region along the banks of the Gila river in Arizona, although less frequently they may still be found as far west as the Mojave desert in California. But those are wrong who believe that the *Heloderma* is living only in the most arid portions of the southwest. There are several reasons why the reptile seeks eagerly irrigated places, which are productive of some vegetation,

for it needs water, food and shady hiding-places.

In the middle of summer, when even the larger streams are dried up, the Gila Monster retires to some burrow, abandoned by another animal, or to deep crevices in the rocks, and spends there in a torpid state several weeks, until the great rainfalls relieve the country, give fresh plant life and fill again the barren riverbeds. This is the animal's summer retreat. During the course of a year it takes a second and longer one, the regular hibernation, that lasts about from November to the middle of February, when it resumes its outside life again. It loves to bask in the still mild rays of the sun, but as soon as the heat increases the Gila Monster seeks shelter for the day behind stones and boulders, under clumps of cacti and in small mesquite groves along the river banks. It roams about only after sunset or early in the morning. The idea that this lizard enjoys the quivering heat on an open Arizona plain, while other sun and heat-loving reptiles keep in hiding, is as erroneous as many others. Nothing is so absolutely fatal to the *Heloderma* as to be exposed only for half an hour to the direct rays of the sun in midsummer. Another reason why it prefers to live in the neighborhood of streams where plant life is more abundant explains itself by the necessity to provide for food.

Whoever has an opportunity to observe reptiles in confinement for an extended period of time can easily draw conclusions as to their mode of living in freedom. A captive Gila Monster is fed on hens' eggs; in summer one each week, in winter one every two or three weeks. It refuses every other kind of food, however temptingly it may be offered, such as mice, frogs, angleworms, mealworms and the like. It is more than probable that in their wild state they live on a similar diet, consisting then of eggs of other lizards, of turtles and of birds. The animal has the reputation of being destructive to the Arizona quail.

Several writers of Natural History add to this a diet of insects, but the embarrassed locomotion of the *Heloderma* seems to exclude flying and fast-running prey. Nearly all reptiles which feed on eggs climb, as do some snakes, and as

does the slow and clumsy Gila Monster. They are not able to ascend high and straight trees, which, however, are not found in these regions, but they are able to climb bushes and low trees, having somewhat leaning trunks and rough bark. And it is wonderful to see how cleverly it disposes of the sharp claws and the muscular, half-prehensile tail, both in dragging itself up and in retarding an often too rapid descent.

The inquiry may be made: How is it possible that a *Heloderma* lives on eggs alone when it can find them only during the relatively short time of five or six months? First, it may be remembered that this period corresponds nearly to the active life of the animal before and after estivation. The second and more important reason is its remarkable frugality. The digestive organs are so constructed that they adapt themselves to a fast of

many months without injury to the animal.

In captivity the Gila Monster begins to slough about January and continues this process during several months. The epidermis comes off not like a snake's, in a whole piece, but in several, or more frequently in many, fragments.

There is still a wide field open for accurate observation and definite knowledge that we relinquish to the professional naturalist and to those fortunate ones who can study the animal in freedom.

Amelia Walson.

[Editor's Note: The Gila Monster of the illustration is still living and has for some years been the interesting pet of one whose love of nature in all forms has found beauty in the reptile usually shunned alike by the savage and by civilized man.]

BIRD NOTES.

I.

Bit of sunshine taken wings,
Or a spray of golden-rod?
On thistle top he sways and swings,
Or flung high to the sun, he sings—
Perdita—Perdita—Perdita—
'Dita,—Sweet, Sweet—.

II.

Good morning trolled, then all the day,
From thicket hidden bramble bush,
This recluse croons his roundelay.
But startle him,—a flash of gray,
And, Hush—Hush—Hush—Hush—
Go 'way,—Go 'way—.

III.

Wild cherry bough and hanging nest,
And calls amid the apple bloom,
No need to tell whose flaming breast
And fluting note lead all the rest,—
Glory—Glory—Glory—Glory—
Glory,—Come-O, Come-O—.

—Mary Hefferan.

THE POMEGRANATE.

(*Punica granatum.*)

The Pomegranate is tree-like, growing to a height of about fifteen feet and in favorable soil even as high as twenty feet. It is probably native in Persia, though it is found in a wild state in all the countries bordering on the Mediterranean Sea. It is also found in China and Japan and has been brought by man to all of the civilized parts of the globe, where the climate is of a sufficiently high degree of warmth to permit the ripening of its fruit.

This little tree is frequently cultivated not alone for the beauty of its form, but for the beauty of its flowers, which, under cultivation, become doubled and show an increased and striking splendor in the richness of their color.

The etymology of its name is very interesting. The word Pomegranate is from two Latin words, pomum, meaning apple, and granatum, meaning grained or seeded. The former has reference to the shape of the fruit and the latter word to the numerous seeds contained in the pulp. The technical name of the Pomegranate plant is *Punica granatum*. The generic name *Punica* is evidently from the Latin word *punicus*, meaning red, and refers to the red color of the pulp or possibly also to the scarlet flowers. The name *Punicus* was also used by the Romans with reference to the Carthaginians, and signified untrustworthy or treacherous, this people having such a reputation with them; thus the name may have been applied to this fruit which, though it delights the eye, is disappointing to the taste.

Pliny tells us that the Pomegranate was extensively cultivated by the Carthaginians at their home in Northern Africa. This may have been the reason why the name *Punica* was selected for the genus by Linnaeus. The Romans also called it "*Pomum Punicum*," or Carthage apple.

That the knowledge of this tree is of great antiquity is shown in many ways. It is frequently referred to in ancient Sanskrit writings of a time earlier than that of the Christian Era. In this language it was called "*Dadimba*." Homer, in the *Odyssey*, speaks of its cultivation in the gardens of the kings of Phrygia and Phaeacia. There are frequent references to it in the Old Testament. In the directions for making Aaron's robe we find the following passage: "Upon the skirts of it thou shalt make pomegranates of blue, and of purple, and of scarlet," and again, "They made bells of pure gold, and put the bells between the pomegranates." Hiram, in the building of Solomon's house, used the design of the Pomegranate. In the seventh chapter of the First Book of Kings we find "the pomegranates were two hundred, in rows round about upon the other chapter," and in another verse we are told that they were of brass.

Moses spoke of the promised land as a land of "wheat, barley and vines, fig-trees and pomegranates." Solomon indicates that this fruit was cultivated in his time as he speaks of an "orchard of pomegranates with pleasant fruits."

The Pomegranate is frequently represented in the ancient sculptures of the Assyrians and of the Egyptians.

The Pomegranate belongs to the family of plants called *Lythraceae*. This family has about three hundred and fifty species which are widely distributed, but are most abundant in tropical regions, especially in America. In describing the tree Dr. Oliver R. Willis gives the following characteristics: "Branches straight, strong, sub-angular, armed near the ends with spines; young shoots and buds red. Leaves opposite or fascicled, short-stalked, and without stipules. Flowers large, solitary, or two or three together in the axils of the leaves, near



POMEGRANATE.
(*Punica granatum*)
 $\frac{2}{3}$ Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO

the ends of the branchlets. A beautiful object for planted grounds."

The color of the flowers, which develop on the ends of the younger branches, is a deep and rich scarlet or crimson. Many variations have been produced by growing the plants from seeds and one of these bears white flowers. The petals are rounded and usually crumpled.

The fruit, which is a berry about the size of an ordinary orange, is when fresh usually of a reddish yellow color, becoming brownish in drying. The rind is thick and leathery, and encloses a quan-

tity of pulp which is filled with a refreshing juice that is acid. It is of a pinkish or reddish color, and encloses the numerous angular seeds. Probably the chief value of the plant lies in the use of the fruit as a relish, though the rind of the fruit and the bark of the root are used in medicine.

The bark contains a large amount of tannin and from it there is also obtained a bright yellow dye, which is used to produce the yellow Levant Morocco.

In regions without frost the tree is often grown for ornamental purposes.

FISHES AND FISH-CULTURE AMONG THE GREEKS AND ROMANS.

Greek mythology shows us that for a long time, perhaps many centuries, the ancestors of the Greeks knew but very little about the sea or about rivers. The numerous monsters of the sea, products of the imagination, combined in their forms the parts of marine and land animals, including man. The angry waves suggested to them some creature that was wroth; in the ocean depths what more likely to be found than the caverns empty and dry, the homes of the monsters with which they had peopled it? Their knowledge of the sea was of very slow growth. It was yet a divine thing in Homer's time, who lived just before the dawn of history. Their knowledge of marine life had made but little if any greater advance than their knowledge of the sea itself. The people of Homer make no use whatever of fish. We do not find a word indicating that either noble or slave ate fish, although the bill of fare in the Homeric household is given to us with considerable fullness.

Passing over two centuries or more to the Athens of Pericles' time, we will find that a great change has been wrought. Fish is now the daintiest viand that comes into the Athenian market. The fishing

industry has developed and grown to immense proportions. The fishmonger has taken on a character which seems destined to be eternal. Till this day it has suffered no change except that he has transferred to his wife some of the traits that once were his.

The task of supplying the fish-market of Athens and other cities must have required a large number of fishermen. For at this time fish might almost be called the national dish, hence an enormous consumption, whereas the means of capture were far inferior to those of to-day. As a matter of fact the market was supplied from a very wide area, but chiefly from the seas to the east. Far along the north and south shores of the Black Sea the industry was a flourishing one. Particularly from these regions were salted and dried fish supplied. Here they were prepared in the huts of the individual fisherman and were gathered up by the traders, who sailed their little boats far and wide in search of traffic. The fish were exchanged for merchandise, especially for earthen utensils and for clothing. These salted and dried fish were the staple varieties and were supplied to the

market in great quantities, as they were the principal food of the poorer classes and were sold very cheap.

The hours for the fish market in Athens must have been a time of very great interest, not only to the Athenian householder but to the foreigner sojourning within the city. To preserve order and also to give all customers an equal chance to procure the rare specimens offered for sale, several stringent laws were enacted to govern the market. Among other regulations was one requiring the opening of the market to be announced by the ringing of a bell. Apparently there was no fixed moment of time when this bell should be rung, but the time varied little from day to day. If we can believe our ancient authorities, the ringing of the bell was the occasion for a rush, pellmell, to the market, each seeking to obtain the first choice. Strabo tells us an interesting story anent this custom. On one occasion a musician was performing before a number of invited guests, and when, in the midst of a composition, the bell rang, in a moment the guests were up and away to the market, all except one man, who was deaf. When the lyrist had finished he was very careful to thank his lone auditor for his courtesy in remaining to hear him through, instead of running away when the bell rang, as the rest did. "Oh, has the bell rung?" asked the deaf man. And when informed that it had, he, too, hastened to the market.

The Greek interest in fishes seems never to have gone beyond their utility as an article of food. The building of aquaria and fish-ponds never came to be the sport of the Greeks, although they became extravagant luxuries among the Romans. Likewise fishing never became the sport of a Greek gentleman, unless, perchance, at a rather late period. Plato excludes fishing from the sports of a free-born gentleman. The only sport he would have him engage in was the chase, which, athletic games aside, was about the only outdoor sport a Greek gentleman seems to have indulged in. For instance, there is no mention in Greek literature of horseback riding as a pastime, yet horsemanship was an accomplishment in which every Greek gentleman received special

training. Likewise, though fishing was not a recognized sport, yet the science of angling was well understood among them by the third century B. C., and probably much earlier. This we learn from a beautiful poem by the Alexandrian poet Theocritus, entitled "The Fishermen." I will quote a portion of the poem translated into prose, partly because it gives us a picture of some ancient professional fishermen in the camp, partly because it mentions all the ancient instruments of the business.

"Two fishers, on a time, two old men, together lay and slept; they had strown the dry sea-moss for a bed in their watted cabin, and there they lay against the leafy wall. Beside them were strewn the instruments of their toilsome hands, the fishing-creels, the rods of reed, the hooks, the sails bedraggled with sea-spoil, the lines, the weels, the lobster pots woven of rushes, the seines, two oars, and an old coble upon props. Beneath their heads was a scanty matting, their clothes, their sailor's caps. Here was all their toil, here all their wealth. The threshold no door did guard nor a watch-dog; all these things, all, to them seemed superfluity, for Poverty was their sentinel. They had no neighbor by them, but ever against their narrow cabin gently floated up the sea."

Long before daylight one of them awoke and aroused his companion to tell him the dream he had had. I shall quote the dream, as it graphically describes an ancient angler busy at his task: "As I was sleeping late, amid the labors of the salt sea (and truly not too full-fed, for we supped early, if thou dost remember, and did not overtax our bellies), I saw myself busy on a rock, and there I sat and watched the fishes, and kept spinning the bait with the rods. And one of the fish nibbled, a fat one, for in sleep dogs dream of bread, and of fish dream I. Well, he was tightly hooked, and the blood was running, and the rod I grasped was bent with his struggle. So, with both hands, I strained and had a sore tussle for the monster. How was I ever to land so big a fish with hooks all too slim! Then, just to remind him he was hooked, I gently pricked him, pricked, and slackened, and, as he did not run, I took in line. My toil

was ended with the sight of my prize; I drew up a golden, look you, a fish all plated thick with gold. Gently I unhooked him * * * then I dragged him on shore with the ropes."

I leave to the reader the pleasant task of comparing the ancient tackle with the modern. It must be said, however, that the description is rather ideal for the Mediterranean fisherman displays no science in landing his game, but simply throws it high and dry or breaks his tackle. This fact is well attested for the ancients, by several vase and wall paintings portraying fishermen actually at work. These paintings show us that the ancient outfit included a basket, frequently with a long handle, and a vase painting in Vienna undoubtedly suggests its use. The man has caught a fish which he is lifting straight up out of the water, at the same time he is reaching down with his basket, evidently to scoop up the fish just before it leaves the water, similar to the practice in trout-fishing to-day.

Before passing over the Ionian Sea to observe what the Romans did in this field of activity, the quasi-scientific study of fishes among the Greeks, particularly that of Aristotle, should claim our attention. Compared with the work of the moderns Aristotle's work was crude indeed. Estimated as the first attempts at building up a science his work deserves our admiration and, in view of the fact that his writings were standard for nearly two thousand years, it demands our respect.

Aristotle did his work in natural history under the patronage of King Philip of Macedon, who drew upon the resources of the empire to provide him with rare or little known specimens from far and wide. How some of his conclusions were based on insufficient data and are consequently very inaccurate, or even grotesque, his discussion of the eel will illustrate. It must not be taken as a fair sample of his work in general. In fact, it is very unusual. "Among all the animals," he says, "which have blood, the eel is the only one which is not born of copulation or hatched from eggs. The correctness of this statement is evident from the fact that eels make their appearance in marshy bodies of water, and that, too, after all the water has been drawn off and

the mud removed, as soon as the rain-water begins to fill these lakes. They are not produced in dry weather, not even in lakes that never become dry, for they live on the rain-water. It is, therefore, plain that their origin is not due to procreation or to eggs. In spite of this some people think that they are viviparous, because worms have been found in the intestines of some eels, which they believe are the young of the eel. This opinion, however, is erroneous, for they are produced from the so-called 'bowels of the earth' (i. e., the earth-worms), the spontaneous product of mud and moisture."

Turning now to the Romans, we find a somewhat different state of affairs, but different only on the aesthetic side; from a scientific or industrial point of view the Roman, though heir to all the Greek civilization and learning, in this, as in many other lines, made but slight advances.

Fish culture never became a serious occupation among the Romans. It was a pastime, one of the many directions which their senseless luxury took rather than a carefully directed effort to stock ponds and rear fish for food, or as a means of nature study. The immense ponds were stocked with rare fish in preference to useful varieties. Next to the rare species those that could be tamed were in favor. A qualification of the above statements should be made probably, in favor of the Romans who lived during the early Republican period of whom Columella, a Roman writer, has the following to say in his book entitled *De Re Rustica*: "The descendants of Romulus, although they were country folk, took great pains in having upon their farms a sort of abundance of everything which the inhabitants of the city are wont to enjoy. To this end they did not rest contented with stocking with fish the ponds that had been made for this purpose, but in their foresight went to the extent of supplying the ponds formed by nature with the spawn of fish. By this means the lakes Velinus and Sabitinus, and likewise Vulsmensis and Ciminus have furnished in great abundance not only catfish and goldfish, but also all the other varieties of fish which flourish in fresh water." Such were the practices of the Roman country folk in early times, but, strange as it may

seem in view of the extravagance of which the fish pond became the object in later times, no measures were taken to secure the reproduction and free development of staple food fishes.

It is well known that the ancients had a remarkable predilection for fish as a food. The principal luxury of the Roman banquets consisted of fish, and the poets speak of sumptuous tables spread with them exclusively. In the period between the taking of Carthage and the reign of Vespasian, this taste became a perfect passion, and for its gratification the senators and patricians, enriched by the spoils of Asia and Africa, incurred the most foolish expense. Thus Licinius Murena, Quintus Hortensius and Lucius Philippus, spent millions on their fish ponds and in stocking them with rare species. Lucullus was by far the most extravagant of these fish fanciers. A fish pond was to him very much what the yacht is to the modern millionaire. It is his name that we find so frequently in Cicero's letters, when he and his set come in for several cleverly-framed rebukes. "No matter," says Cicero, "about the state, if only their fish-ponds escape harm." It was Lucullus who had a channel cut through a mountain at an immense outlay of money, in order to let salt water into his fish-ponds. We are told by Varro that one Hirrius had an income of nearly \$700,000 from his Roman real estate, and spent the whole amount on his fish-ponds. Some of these fish-ponds were very elaborate. They were constructed with many com-

partments, in which they kept the different varieties. The care of these ponds, and the feeding of the animals, required a large force of trained men and assistants who, we can infer, learned a great deal about the habits of fishes, their favorite food, and how to propagate them, but their information was never reduced to anything like a science.

That foolish extravagance of the Roman nobles produced but two results, the less of which was the impoverishment of some of Rome's wealthiest families; the other and more unfortunate result was the destruction of the fishes along the Mediterranean Sea.

Probably the sole contribution to fish-culture resulting from all this extravagance, was the introduction of gold-fish into an artificial habitat and providing them shell-fish for nourishment.

In conclusion, I will note some of the forms that were most popular among the Romans, either for table use or for the aquarium. For these we are indebted to a mosaic discovered in Pompeii. They are formed as they were seen by the artist in an aquarium, but in the mosaic they are supposed to be seen as if in the sea. The varieties found are: They grey mullet, electric ray, gilt-head, muraena, scorpion fish, crawfish, devil-fish, dog-fish, red-mullet, bass, spinola, red gumara, nautis prawn, and from another mosaic may be added the soft prawn, squid and some other species whose English names I do not know.

T. Louis Comparette.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



CINNAMON.

(*Cinnamomum cassia blume.*)

"*Sinament and ginger, nutmegs and cloves,
And that gave me my jolly red nose.*"

—*Ravenscroft, Deuteromela, Song 7 (1609).*

The cinnamons of the market are the inner barks obtained from trees of tropical countries and islands. The plants are quite ornamental; twenty to forty feet high; smooth, enduring, green, simple and entire leaves. The flowers are small and very insignificant in appearance.

Cinnamon is an old-time, highly-priced spice. It is mentioned in the herb book of the Chinese emperor Schen-nung (2700 B. C.), where it is described under the name Kwei. From China it was introduced into Egypt about 1600 or 1500 B. C. The cinnamon and cassia mentioned in the Bible were introduced by the Phoenicians. About 400 or 300 B. C. cinnamon still belonged to the rarities of the market and little was known regarding its origin and cultivation. Plinius stated that it was not a native of Arabia, but does not explain what its native country was. About the fourth century of our era cinnamon found its way into Turkey and Asia Minor, where it was employed as incense in church ceremonies. In the sixth century Trallianus recommended the still very expensive spice for medicinal purposes. During the tenth century the price of this article became much reduced and it was used as a spice, principally in the preparation of fish meats. In England it was used in veterinary practice. Although China is undoubtedly the home of the cinnamons they were apparently entirely overlooked by Marco Polo, the eminent traveler and historian, who visited the greater part of China. Oil of cinnamon was prepared as early as 1540.

There are several varieties of cinnamon upon the market. Cassia cinnamon, which is a Chinese variety, is obtained from *Cinnamomum cassia*. The bark is quite thick and contains only a small amount

of volatile or ethereal oil. It is of little value yet it is exported on a large scale. It forms the cheap cinnamon of the market. There are other Chinese cinnamons of good quality which constitute the principal commercial article. The Saigon cinnamon is by far the best article. It also is Chinese, obtained from an undetermined species. It is the strongest and spiciest of the cinnamons and it is the only variety official in the United States Pharmacopoeia. The bark is of medium thickness, deep reddish brown and rich in volatile oil. The Ceylon cinnamon, from India, is noted for the delicacy of its flavor, but it contains comparatively little volatile oil. The bark is very thin and of a lighter brown color than that of the Saigon cinnamon.

Nearly all of the cinnamon of the market is obtained from cultivated plants. There are large plantations in southeastern China, Cochinchina, India, Sunda islands, Sumatra, Java and other tropical countries and islands. In many instances little or nothing is known regarding the cultivation, collecting and curing of cinnamons. As a rule the trees are pruned for convenience in collecting the bark. In the better-grade cinnamons the bark from the younger twigs only (1½ to 2 years old) is collected. This is removed in quills, the outer corky inert layers being discarded and dried. As the drying proceeds the smaller quills are telescoped into the larger for convenience in handling, packing and shipping. The color changes to a reddish brown and the aroma increases. Two crops are collected annually; one, the principal crop, in May and June; the second from November to January. The blossoms are formed during May and June and the fruit ripens in January; these periods correspond to the

periods of collecting. The older, dry, corky bark should not be collected, as it contains little volatile oil. In all carefully prepared cinnamons the outer bark layers are removed by scraping.

Cinnamon is quite frequently adulterated; poor qualities are substituted for good qualities or added to the better qualities. This applies especially to ground cinnamon.

Cinnamon is one of the richest of the spices. Its flavor is quite universally liked. It is employed in pies and other pastry, in drinks, in the preparation of hair oils and hair tonics, in confectionery, with pickles, etc., etc. Medicinally it is employed as a corrective, in dysentery and in coughs. The excessive consumption of spices, cinnamon included, is a pernicious practice, as may be gathered from the opening quotation from

Ravenscroft. Spices cause pathological changes in stomach, the liver and other glandular organs in particular. Quite frequently those addicted to the use of spices are also addicted to the use of alcoholic drinks, and it is more than likely that the "jolly red nose" referred to was caused by the alcoholic stimulants rather than the spices.

The not fully matured flowers are known as cassia buds and are used as a spice. They are not unlike cloves in appearance. The roots of the various cinnamon trees yield camphor. The leaves yield volatile oil and the seeds a faintly aromatic fat.

Description of Plate: A, flowering twig; 1, diagram of flower; 2, 3, flower; 4, stamen; 5, pistil; 6, fruit.

Albert Schneider.

AT DUSK.

Dark shadows fall upon the earth,
Cool vapors rise in air,
The screech-owl in the copse is heard,
The bees are freed from care.

The butterfly has closed its wings,
The lark has gone to rest;
The nightingale in tree-top sings;
To sleep the crow thinks best.

The lightning bug glows in the brake;
The cricket chirps beneath the stone;
The whip poor will is yet awake,
The bull-frog calls in deep, low tone.

The flowers droop their weary heads,
The leaves are nodding in the breeze;
Young birdlings sleep in downy beds;
Squirrels are resting in the trees.

The bats are flying low and high;
The fishes rest in waters deep.
The red has gone from western sky,
All nature soon will be asleep.

—Albert Schneider.



BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IX.

MARCH, 1901.

No. 3

SPRING.

Gentle Spring! in sunshine clad,
Well dost thou thy power display!
For Winter maketh the light heart sad,
And thou, thou makest the sad heart gay.
He sees thee, and calls to his gloomy train,
The sleet, and the snow, and the wind, and the rain;
And they shrink away, and they flee in fear,
When thy merry step draws near.

Winter giveth the fields and the trees, so old,
Their beards of icicles and snow;
And the rain, it raineth so fast and cold,
We must cower over the embers low;
And, snugly housed from the wind and weather,
Moop like birds that are changing feather.
But the storm retires, and the sky grows clear,
When thy merry step draws near.

Winter maketh the sun in the gloomy sky
Wrap him around with a mantle of cloud;
But, Heaven be praised, thy step is nigh;
Thou tearest away the mournful shroud,
And the earth looks bright, and Winter surly,
Who has toiled for naught both late and early,
Is banished afar by the new born year,
When thy merry step draws near.

—From the French of Charles D'Orleans,
Henry Wadsworth Longfellow.

ABOUT PARROTS.

Naturalists place the parrot group at the head of bird creation. This is done, not, of course, because parrots can talk, but because they display, on the whole, a greater amount of intelligence, of cleverness and adaptability to circumstances than other birds, including even their cunning rivals, the ravens and the jackdaws.

It may well be asked what are the causes of the exceptionally high intelligence in parrots. The answer which I suggest is that an intimate connection exists throughout the animal world between mental development and the power of grasping an object all round, so as to know exactly its shape and its tactile properties. The possession of an effective prehensile organ—a hand or its equivalent—seems to be the first great requisite for the evolution of a high order of intellect. Man and the monkeys, for example, have a pair of hands; and in their case one can see at a glance how dependent is their intelligence upon these grasping organs. All human arts base themselves ultimately upon the human hand; and our nearest relatives, the anthropoid apes, approach humanity to some extent by reason of their ever-active and busy little fingers. The elephant, again, has his flexible trunk, which, as we have all heard over and over again, is equally well adapted to pick up a pin or to break the great boughs of tropical forest trees. The squirrel, also, remarkable for his unusual intelligence when judged by a rodent standard, uses his little paws as hands by which he can grasp a nut or fruit all round, and so gain in his small mind a clear conception of its true shape and properties. Throughout the animal kingdom generally, indeed, this chain of causation makes itself everywhere felt; no high intelligence without a highly-developed prehensile and grasping organ.

Perhaps the opossum is the best and most crucial instance that can be found of the intimate connection which exists

between touch and intellect. The opossum is a marsupial; it belongs to the same group of lowly-organized, antiquated and pouch-bearing animals as the kangaroo, the wombat, and other Australian mammals. Everybody knows that the marsupials, as a class, are preternaturally dull—perhaps the least intelligent of all existing quadrupeds. And this is reasonable when one considers the subject, for they represent a very early type, the first “rough sketch” of the mammalian idea, with brains unsharpened as yet by contact with the world in the fierce competition of the struggle for life as it displays itself on the crowded stage of the great continents. They stand, in fact, to the lions and tigers, the elephants and horses, the monkeys and squirrels of America and Europe, as the native Australian stands to the American or the Englishman. They are the last relic of the original secondary quadrupeds, stranded for centuries on a Southern island, and still keeping up among Australian forests the antique type of life that went out of fashion elsewhere a vast number of years ago. Hence they have brains of poor quality, a fact amply demonstrated by the kangaroo when one watches his behavior in the zoological gardens.

Every high-school graduate is well aware that the opossum, though it is a marsupial, differs in psychological development from the kangaroo and the wombat. The opossum is active and highly intelligent. He knows his way about the world in which he lives. “A ’possum up a gum tree” is accepted by observant minds as the very incarnation of animal cunning and duplicity. In negro folklore the resourceful ’possum takes the place of the fox in European stories; he is the Macchiavelli of wild beasts; there is no ruse on earth of which he is not amply capable; and no wily manoeuvre exists which he cannot carry to an end successfully. All guile and intrigue, the



OWL PARROT (NEW ZEALAND).
(*Strigops habroptilus*.)
 $\frac{2}{3}$ Life-size.

FROM COL. CHY. ACAD. SCIENCES,
1893

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

possum can circumvent even Uncle Remus himself by his crafty diplomacy. And what is it that makes all the difference between this 'cute marsupial and his backward Australian cousins? It is the possession of a prehensile hand and tail. Therein lies the whole secret. The opossum's hind foot has a genuine apposable thumb; and he also uses his tail in climbing as a supernumerary hand, almost as much as do any of the monkeys. He often suspends himself by it, like an acrobat, swings his body to and fro to obtain speed, then lets go suddenly, and flies away to a distant branch, which he clutches by means of his hand-like hind foot. If the toes make a mistake, he can recover his position by the use of his prehensile tail. The result is that the opossum, being able to form for himself clear and accurate conceptions of the real shapes and relations of things by these two distinct grasping organs, has acquired an unusual amount of general intelligence. And further, in the keen competition for life, he has been forced to develop an amount of cunning which leaves his Australian poor relations far behind in the Middle Ages of psychological evolution.

At the risk of appearing to forsake my ostensible subject altogether, I must pause for a moment to answer a very obvious objection to my argument. How about the dog and the horse? They have no prehensile organ, and yet they are admitted to be the most intelligent of all quadrupeds. The cleverness of the horse and the dog, however, is acquired, not original. It has arisen in the course of long and hereditary association with man, the cleverest and most serviceable individuals having been deliberately selected from generation to generation as dams and sires to breed from. We cannot fairly compare these artificial human products with wild races whose intelligence is entirely self-evolved. In addition, the horse has, to a slight extent, a prehensile organ in his mobile and sensitive lip, which he uses like an undeveloped or rudimentary proboscis with which he can feel things all over. We may conclude, I believe, that touch is "the mother-tongue of the senses;" and that in proportion as animals have or have not

highly developed and serviceable tactile organs will they rank high or low in the intellectual hierarchy of nature. It may well be asked how all this concerns the family of parrots. In the first place, anybody who has ever kept a parrot or a macaw in slavery is well aware that in no other birds do the claws so closely resemble a human or simian hand, not indeed in outer form or appearance, but in apposability of the thumbs and in perfection of grasping power. The toes upon each foot are arranged in opposite pairs—two turning in front and two backward, which gives all parrots their peculiar firmness in clinging on a perch or on the branch of a tree with one foot only, while they extend the other to grasp a fruit or to clutch at any object they desire to possess. This peculiarity, it must be admitted, is not confined to the parrots, for they share the division of the foot into two thumbs and two fingers with a large group of allied birds, called, in the exact language of technical ornithology, the Scansorial Picarians, and more generally known by their several names of cockatoos, toucans and wood-peckers. All the members of this great group, of which the parrots proper are only the most advanced and developed family, possess the same arrangement of the digits into front-toes and back-toes, and in none is the power of grasping an object all round so completely developed and so full of intellectual consequences.

All the Scansorial Picarians are essentially tree-haunters; and the tree-haunting and climbing habit seems specially favorable to the growth of intellect. Monkeys, squirrels, opossums, wild cats, are all of them climbers, and all of them, in the act of climbing, jumping, and balancing themselves on boughs, gain such an accurate idea of geometrical figures, distance, perspective and the true nature of space-relations, as could hardly be acquired in any other way. In a few words, they thoroughly understand the tactual realities that answer to and underlie each visible appearance. This is, in my opinion, one of the substrata of all intelligence; and the monkeys, possessing it more profoundly than any other animals, except man, have accordingly reached a very high place in the competitive ex-

amination perpetually taking place under the name of Natural Selection.

So, too, among birds, the parrots and their allies climb trees and rocks with exceptional ease and agility. Even in their own department they are the great feathered acrobats. Anybody who watches a wood-pecker, for example, grasping the bark of a tree with its crooked and powerful toes, while it steadies itself behind by digging its stiff tail-feathers into the crannies of the outer rind, will readily understand how clear a notion the bird must gain into the practical action of the laws of gravity. But the true parrots go a step further in the same direction than the wood-peckers or the toucans; for in addition to prehensile feet, they have also a highly-developed prehensile bill, and within it a tongue which acts in reality as an organ of touch. They use their crooked beaks to help them in climbing from branch to branch; and being thus provided alike with wings, hands, fingers, bill and tongue, they are the most truly arboreal of all known animals, and present in the fullest and highest degree all the peculiar features of the tree-haunting existence.

Nor is this all. Alone among birds or mammals, the parrots have the curious peculiarity of being able to move the upper as well as the lower jaw. It is this strange mobility of both the mandibles together, combined with the crafty effect of the sideways glance from those artful eyes, that gives the characteristic air of intelligence and wisdom to the parrot's face. We naturally expect so clever a bird to speak. And when it turns upon us suddenly with some well-known maxim, we are not astonished at its remarkable intelligence.

Parrots are true vegetarians; with a single degraded exception, to which I shall recur hereafter, they do not touch animal food. They live chiefly upon a diet of fruit and seeds, or upon the abundant nectar of rich tropical flowers. And it is mainly for the purpose of getting at their chosen food that they have developed the large and powerful bills which characterize the family. Most of us have probably noticed that many tropical fruit-eaters, like the hornbills and the toucans, are remarkable for the size and strength of

their beaks; and the majority of thinking people are well acquainted with the fact that tropical fruits often have thick or hard or bitter rinds, which must be torn off before the monkeys or birds, for whose use they are intended, can get at them and eat them.

As monkeys use their fingers in place of knives and forks, so birds use their sharp and powerful bills. No better nut-crackers and fruit-parers could possibly be found. The parrot, in particular, has developed for the purpose his curved and inflated beak—a wonderful weapon, keen as a tailor's scissors, and moved by powerful muscles on both sides of the face which bring together the cutting edges with extraordinary energy. The way the bird holds a fruit gingerly in one claw, while he strips off the rind dexterously with his under-hung lower mandible, and keeps a sharp look-out meanwhile for a possible intruder, suggests to the observing mind the whole living drama of his native forest. One sees in that vivid world the watchful monkey ever ready to swoop down upon the tempting tail-feathers of his hereditary foe; one sees the parrot ever prepared for his rapid attack, and eager to make him pay with five joints of his tail for his impertinent interference with an unoffending fellow-citizen of the arboreal community.

Of course there are parrots and parrots. The great black cockatoo, for example, the largest of the tribe, lives almost exclusively upon the central shoot of palm-trees; an expensive kind of food, for when once this so-called "cabbage" has been eaten the tree dies, so that each black cockatoo must have killed in his time whole groves of cabbage-palms. Other parrots live on fruits and seeds; and quite a number are adapted for flower-haunting and honey-sucking.

As a group, the parrots must be comparatively modern birds. Indeed, they could have no place in the world till the big tropical fruits and nuts were beginning to be developed. And it is now generally believed that fruits and nuts are for the most part of recent and special evolution. To put the facts briefly, the monkeys and parrots developed the fruits and nuts, while the fruits and nuts returned the compliment by developing

conversely the monkeys and parrots. In other words, both types grew up side by side in mutual dependence, and evolved themselves *pari passu* for one another's benefit. Without the fruits there could be no fruit-eaters; and without the fruit-eaters to disperse their seeds, there could not be any great number of fruits.

Most of the parrots very much resemble the monkeys and other tropical fruit-eaters in their habits and manners. They are gregarious, mischievous and noisy. They have no moral sense, and are fond of practical jokes. They move about in flocks, screeching aloud as they go, and alight together on some tree well covered with berries. No doubt they herd together for the sake of protection, and screech both to keep the flock in a body and to strike consternation into the breasts of their enemies. When danger threatens, the first bird that perceives it sounds a note of warning; and in a moment the whole troupe is on the wing at once, vociferous and eager, roaring forth a song in their own tongue, which may be interpreted to mean that they are ready to fight if it is necessary.

The common gray parrot, the best known in confinement of all his kind, and unrivalled as an orator for his graces of speech, is a native of West Africa. He feeds in a general way upon palm-nuts, bananas, mangoes, and guavas, but he is by no means averse, if opportunity offers, to the Indian corn of the industrious native. It is only in confinement that this bird's finer qualities come out, and that it develops into a speechmaker of distinguished attainments.

A peculiar and exceptional offshoot of the parrot group is the brush-tongued lory, several species of which are common in Australia and India. These interesting birds are parrots which have a resemblance to humming birds. Flitting about from tree to tree with great rapidity, they thrust their long extensible tongues, penciled with honey-gathering hairs, into the tubes of many big tropical blossoms. The lorries, indeed, live entirely on nectar, and they are so common in the region they have made their own that the larger flowers there present the appearance of having been developed with a special view to their tastes and habits,

as well as to the structure of their peculiar brush-like honey-collector. In most parrots the mouth is dry and the tongue horny; but in the lorries it is moist and much more like the same organ in the humming-birds and the sun-birds. The prevalence of very large and brilliantly-colored flowers in the Malayan region must be set down for the most part to the selective action of the color-loving, brush-tongued parrots.

The Australian continent and New Zealand, as everybody knows, are the countries where everything goes by contraries. And it is here that the parrot group has developed some of its most curious offshoots. One would imagine beforehand that no two birds could be more unlike in every respect than the gaudy, noisy, gregarious cockatoos and the sombre, nocturnal, solitary owls. Yet the New Zealand owl-parrot is a lory which has assumed all the appearances and habits of an owl. A lurker in the twilight or under the shades of night, burrowing for its nest in holes in the ground, it has dingy brown plumage like the owls, with an undertone of green to bespeak its parrot origin; while its face is entirely made up of two great disks, surrounding the eyes, which succeed in giving it a most marked and unmistakable owl-like appearance.

Why should a parrot so strangely disguise itself and belie its ancestry? The reason is not difficult to discover. It found a place for itself ready made in nature. New Zealand is a remote and sparsely-stocked island, peopled by various forms of life from adjacent but still distant continents. There are no dangerous enemies there. Here, then, was a great opportunity for a nightly prowler. The owl-parrot, with true business instinct, saw the opening thus clearly laid before it, and took to a nocturnal and burrowing life, with the natural consequence that those forms survived which were dingy in color. Unlike the owls, however, the owl-parrot, true to the vegetarian instincts of the whole lory race, lives almost entirely upon sprigs of mosses and other creeping plants. It is thus essentially a ground bird; and as it feeds at night in a country possessing no native beasts of prey, it has almost lost

the power of flight, and uses its wings only as a sort of parachute to break its fall in descending from a rock or a tree to its accustomed feeding-ground. To ascend a steep place or a tree, it climbs, parrot-like, with its hooked claws, up the surface of the trunk or the face of the precipice.

Even more aberrant in its ways, however, than the burrowing owl-parrot, is that other strange and hated New Zealand lory, the kea, which, alone among its kind, has adjured the gentle ancestral vegetarianism of the cockatoos and macaws, in favor of a carnivorous diet of remarkable ferocity. And what is stranger still, this evil habit has been developed in the kea since the colonization of New Zealand by the British, the most demoralizing of new-comers, as far as all aborigines are concerned. The English settlers have taught the Maori to wear silk hats and to drink strong liquors, and they have thrown temptation in the way of even the once innocent native parrot. Before the white man came, the kea was a mild-mannered, fruit-eating or honey-sucking bird. But as soon as sheep-stations were established on the island these degenerate parrots began to acquire a distinct taste for raw mutton. At first they ate only the offal that was thrown out from the slaughter-houses, picking the bones as clean of meat as a dog or a jackal. But in course of time, as the taste for blood grew, a new and debased idea entered their heads. If dead sheep are good to eat, are not living ones? The keas, having pondered deeply over this abstruse problem, solved it in the affirmative. Proceeding to act upon their convictions, they invented a truly hideous mode of procedure. A number of birds hunt out a weakly member of a flock, almost always after dark. The sheep is worried to death by the combined efforts of the parrots, some of whom perch themselves upon the animal's back and tear open the flesh, their object being to reach the kidneys, which they devour at the earliest possible moment. As many as two hundred ewes are said to have been killed in a single night on one "station"—ranch, we should call it. I need hardly say that the New Zealand sheep-farmer resents this irregular procedure, so op-

posed to all ideas of humanity, to say nothing of good-farming, and, as a result, the existence of the kea is now limited to a few years. But from a purely psychological point of view the case is interesting, as being the best recorded instance of the growth of a new and complex instinct actually under the eyes of human observers.

A few words as to the general coloring of the parrot group. Tropical forestine birds have usually a ground tone of green because that color enables them best to escape notice among the monotonous verdure of equatorial woodland scenery. In the north, it is true, green is a very conspicuous color; but that is only because for half the year our trees are bare, and even during the other half they lack that "breadth of tropic shade" which characterizes the forests of all hot countries. Therefore, in temperate climates, the common ground-tone of birds is brown, to harmonize with the bare boughs and leafless twigs, the dead grass or stubble. But in the ever-green tropics, green is the proper hue for concealment or defense. Therefore the parrots, the most purely tropical family of birds on earth, are chiefly greenish; and among the smaller and more defenceless sorts, like the little love-birds, where the need for protection is greatest, the green of the plumage is almost unbroken. Green, in truth, must be regarded as the basal parrot tint, from which all other colors are special decorative variations.

But fruit-eating and flower-feeding creatures—such as butterflies and humming birds—seeking their food among the brilliant flowers and bright berries, almost invariably acquire a taste for varied coloring, and by the aid of the factor in evolution, known as sexual selection, this taste stereotypes itself at last upon their wings and plumage. They choose their mates for their attractive coloring. As a consequence, all the larger and more gregarious parrots, in which the need for concealment is less, tend to diversify the fundamental green of their coats with red, yellow or blue, which in some cases takes possession of the entire body. The largest kinds of all, like the great blue and yellow or crimson macaws, are as gorgeous as birds well

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



GRAY PARROT (AFRICA).
(*Psittacus erithacus*.)
 $\frac{3}{4}$ Life-size.

could be; they are also the species least afraid of enemies. In Brazil, it is said, they may often be seen moving about in pairs in the evening with as little attempt at concealment as storks in Germany.

Even the New Zealand owl-parrot still retains many traces of his original greenness, mixed with the brown and dingy yellow of his nocturnal and burrowing nature.

I now turn to the parrot's power of mimicry in human language. This power is only an incidental result of the general intelligence of parrots, combined with the other peculiarities of their social life and forestine character. Dominant woodland animals, like monkeys and parrots, at least if vegetarian in their habits, are almost always gregarious, noisy, mischievous, and imitative. And the imitation results directly from a somewhat high order of intelligence. The power of intellect, in all except the very highest phases, is merely the ability to accurately imitate another. Monkeys imitate action to a great extent, but their voices are hardly flexible enough for very much

mimicry of the human voice. Parrots and some other birds, on the contrary, like the mocking bird, being endowed with considerable flexibility of voice, imitate either songs or spoken words with great distinctness. In the parrot the power of attention is also very considerable, for the bird will often repeat to itself the lesson it has decided to learn. But most of us forget that at best the parrot knows only the general application of a sentence, not the separate meanings of its component words. It knows, for example, that "Polly wants a lump of sugar" is a phrase often followed by a gift of food. But to believe it can understand an exclamation like "What a homely lot of parrots!" is to credit the bird with genuine comprehension. A careful consideration of the evidence has convinced almost all scientific men that, at the most, a parrot knows the meaning of a sentence in the same way as a dog understands the meaning of "Rats" or a horse knows the significance of "Get up."

Lawrence Irwell.

How can our fancies help but go
Out from this realm of mist and rain,
Out from this realm of sleet and snow,
When the first Southern violets blow?

—Thomas Bailey Aldrich, "Spring in New England."

POLLY.

Letty was out under the big elm tree watching the kitten playing with the autumn leaves that were on the ground.

Suddenly something struck Letty on the shoulder. She looked around quickly, thinking that somebody had thrown a stone at her. No one was in sight, though she looked all about and even up in the tree. Then she noticed that the kitten was rolling something with its paws. She stooped and picked up what looked like a little bunch of elm leaves. She thought it strange that they should be stuck together, and when she found that it was quite heavy she was still more surprised.

She carried it into the house to show to her mother. "What is it?" she asked. "It came down off the tree and hit me on my shoulder. Is there a stone inside of it?"

"No," said her mother. "It is a chrysalis. Some worm that lived on the elm tree drew these leaves together and spun a little case inside, and when the leaves were ready to fall, the chrysalis came down with them."

"What kind of a worm do you suppose it was?"

"I do not know, but it must have been a large one, or the chrysalis would not be so heavy. We will keep it, and in the spring when the worm has turned into a butterfly and comes out of the case, perhaps we can learn what its name is."

"But how will it get out?" asked Letty, anxiously. "It is so hard and tough. I tried to pull off one of the leaves and it stuck on tight."

"Yes," said her mother, "it is very tough and you could not tear it open with your fingers even if you tried very hard. But the butterfly throws out some kind of fluid which softens the silk—for it is a kind of silk, you know—and makes a hole large enough to crawl through. It

does not have to be very big, as the butterfly's wings are soft and wet. It has to let them dry and grow strong and stiff before it can fly."

The chrysalis was put in a safe place and Letty forgot all about it for many months, which was not strange when there were so many things for her to do all through the winter and early spring.

But her mother did not forget, and one day in June she called Letty in from her play telling her that she had something to show her.

"Do you remember the elm chrysalis?" she asked, and she put it in Letty's hand.

"Why how light it is!" she cried. "The butterfly has come out, oh! where is it?"

Her mother led the way to the plant stand. "See, on that begonia," she said.

"Oh, oh!" cried Letty, "what a beautiful butterfly!"

It was very large, nearly five inches across when its wings were spread. It was dull yellow, with darker shadings, a little red in waving lines, and a gray stripe along the front edge of its outer wings. It was quite furry, especially the large yellow body. Each of the four wings had a transparent eye spot, and the under wings had a good deal of black about these little round windows, as Letty called them.

"And, mamma, see! It has beautiful little dark-blue eyes."

"Yes, it has, but I did not notice them before."

"Well, what kind of a butterfly is it?"

"It is not a butterfly at all."

"Not a butterfly?" said Letty, surprised.

"No; it is a moth. Have you noticed its antennae—the horns on the front of its head?"

"They look like feathers," said Letty; "no, like ferns."

"So they do," said her mother. "Well,

that is how we know it is not a butterfly, for they have thread-like antennae, with a little knob on the end. Moths fly by night and that is probably why this one stays so still now."

"I wish I knew its name," said Letty.

"If you will take my card and run over to the public library and ask the librarian to give you a book that tells about moths and butterflies, we will find out."

Letty came back in a little while with the book and her mother began to look in it.

"Oh!" she said pretty soon, "it has such a long name that I don't believe

you can remember it. It is *Telea polyphemus*."

"I'll call it Polly for short," said Letty.

When they had learned all they could about the moth Letty asked what they should do with it.

"This book says they do no very great harm," said her mother, "and it is so beautiful that I think we will let it have its liberty."

So the *Telea polyphemus* was carried out and placed on a tree trunk where it stayed all the rest of the day. But the next morning when Letty went to look for it, it was gone.

Susan Brown Robbins.

Hark! 't is the bluebird's venturous strain
High on the old fringed elm at the gate—
Sweet-voiced, valiant on the swaying bough,
Alert, elate,
Dodging the fitful spits of snow,
New England's poet-laureate
Telling us Spring has come again!
—Thomas Bailey Aldrich, "Spring in New England."

THE AMERICAN WHITE PELICAN.

(*Pelecanus erythrorhynchos.*)

In the year 1758 the naturalist Linnaeus gave to the birds called Pelicans the generic name *Pelecanus*. In this genus he also placed the cormorants and the gannets. These with the snake-birds, the frigate-birds and the tropic-birds were for a long time grouped together under the family name *Pelecanidae*. This name, however, is now restricted to the various species of the Pelicans which are included in a single genus.

The generic name *Pelecanus* and the common name Pelican are derived from *pelekan*, the Greek name for these birds. They were well known to the ancients by whom they were called *Ornacrotalus*. There is a legend of great antiquity for which there is no foundation in fact, which states that the pelican feeds to her young blood drawn from her own breast, in which she herself has made the incision.

There are about ten species of pelicans distributed throughout the world, mostly confined to those countries having warm climates. Two or three species, however, extend their range into the colder regions during the summer months. Three of the species inhabit North America and two of these are seldom seen except on the sea coasts; the brown pelican (*Pelecanus fuscus*) on the Atlantic coast and the California brown pelican (*Pelecanus californicus*) on the Pacific coast. The other species is the bird of our illustration, and is common in the interior as well as on the seaboard of California.

The pelicans are notably social in their habits, a large number nesting together. The flight of a large flock is an attractive sight. Their wings move in unison and apparently without much effort. After a few strokes of the wings they frequently sail, forming graceful circles, often at great elevations.

The most remarkable characteristic of

these birds, however, is the large pouch formed by an elastic skin depending from the two sides of the lower mandible and extending nearly the whole length of the bill. This pouch may be greatly distended and will hold a large quantity of either solid or liquid matter. The bills are depressed and strongly hooked.

The American White Pelican ranges throughout the whole of North America as far north, in the interior, as the 61° north latitude, and as far to the southward in winter as Central America. Northward from Florida, along the Atlantic coast, it is now rare.

In the year 1838 Audubon gave this species the specific name *Americanus*, in view of his discovery that it differed in essential characteristics from the European form, called *Ornacrotalus*. The most marked difference that he noticed was the crest upon the upper mandible which he supposed was permanent and not, as we now know, a characteristic of this species only during the breeding season. In writing of the naming of this species he uses the following beautiful language: "In consequence of this discovery, I have honored it with the name of my beloved country, over the mighty streams of which may this splendid bird wander free and unmolested to the most distant times, as it has already done in the misty ages of unknown antiquity."

Much as we desire to honor Audubon, who has given us so much of interest concerning the life histories of the birds, yet we are restrained by the rules of scientific naming, which require under ordinary circumstances, the use of the earliest name. Audubon's name was antedated by that of Gmelin, a German Naturalist, who in 1788 noticing the peculiar characteristics of the American White Pelican and that it differed from the European



FROM COL. CHI. ACAD. SCIENCES.

395

AMERICAN WHITE PELICAN.
(*Pelecanus erythrorhynchos*.)
About 1/2 Life-size.

CHICAGO COLORTYPE CO.

COPYRIGHT 1901, BY
A. W. MUMFORD, CHICAGO.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

form, gave it the name *erythrorhynchos*, which is now used by ornithologists. This name has its origin in two Greek words, meaning red and bill.

The peculiar growth or crest on the bill which disappears soon after the breeding season, varies greatly both in size and shape. Dr. Ridgway says: "Frequently it consists of a single piece, nearly as high as long, its vertical outlines almost parallel, and the upper outline quite regularly convex, the largest specimen seen being about three inches high, by as many in length. More frequently, however, it is very irregular in shape, usually less elevated, and not infrequently with ragged anterior, or even posterior continuations." At this time the bill is also more or less orange-red in color.

An excellent narrative of the habits of the White Pelican is given in the Ornithology of Illinois, where Dr. Ridgway quotes the words of Col. N. S. Goss regarding those who "have not seen the White Pelicans upon their feeding grounds, but may have read Audubon's interesting description of the manner in which the birds unite and drive the fishes into shallow water, where they can catch them, which they cannot well do in deep water, as their skins are honey-combed with air cells that buoy them up like cork, and prevent their diving, and they do not plunge for their food when upon the wing, like their cousins, the Brown Pelicans, and therefore have to adopt fishing habits suited to shallow waters. I have often noticed the birds in flocks, in pairs, or alone, swimming on the water with partially opened wings, and head drawn down and back, the bill just clearing the water, ready to strike and gobble up the prey within their reach; when so fishing, if they ran into a shoal of minnows, they would stretch out their necks, drop their heads upon the water, and with open mouths and extended pouches, scoop up the tiny fry. Their favorite time for fishing on the seashore is during the incoming tide, as with it come the small fishes to feed upon the insects caught in the rise, and upon the low form of life in the drift, as it washes shoreward, the larger fishes following in their wake, each, from the smallest to the large-

est, eagerly engaged in taking life in order to sustain life. All sea-birds know this, and the time of its coming well. The White Pelicans, that have been patiently waiting in line along the beach, quietly move into the water and glide smoothly out so as not to frighten the life beneath. At a suitable distance from the shore they form into line in accordance with the sinuosities of the beach, each facing shoreward and awaiting their leader's signal to start. When this is given, all is commotion; the birds, rapidly striking the water with their wings, throwing it high above them and plunging their heads in and out, fairly make the water foam as they move in an almost unbroken line, filling their pouches as they go. When satisfied with their catch, they wade and waddle into line again upon the beach, where they remain to rest, standing or sitting as suits them best, until they have leisurely swallowed the fishes in their nets; then, if undisturbed, they generally rise in a flock and circle for a long time high in air."

The White Pelicans will consume a large amount of food; in fact, they are gluttonous. It is said that the remains of several hundred minnows have been taken from the stomach of a single pelican. Usually they are the most active in the pursuit of their prey for a short time after sunrise and also before sunset.

The chief breeding grounds of the White Pelican are from Minnesota northwards to the limit of its range. It nests also in isolated and greatly separated localities to the westward. It is said that several thousand permanently breed on the islands of the great Salt Lake. There are reasons for believing that it also breeds in Florida and westward along the Gulf of Mexico as far as Texas.

The White Pelican builds its nest on the ground using small sticks and twigs. They usually select a clump of sage or some other plant that will afford the nest some protection. Frequently sand is heaped around the nest to the depth of about six inches. The nests are about one foot in diameter. The color of the two to four eggs is a chalky white and the surface is quite rough, due to the irregular thickness of the outer coating. The average size of the eggs is about three and one-half by two and one-third inches.

The White Pelican as it calmly floats
on the surface of the water, some distance
from the shore, has been mistaken for the
sail of a boat as the moist white feathers
glisten in the sunshine.

Longfellow has beautifully woven this
fact into the "Song of Hiawatha."
"O'er the water floating, flying,
Something in the hazy distance,
Something in the mists of morning,
Loomed and lifted from the water,
Now seemed floating, now seemed flying,
Coming nearer, nearer, nearer.

Was it Shingebis the diver?
Or the pelican, the Shada?
Or the heron, the Shuh-shuh-gah?
Or the white-goose, Waw-be-wawa,
With the water dripping, flashing
From its glossy neck and feathers?

It was neither goose nor diver,
Neither pelican nor heron
O'er the water floating, flying,
Through the shining mist of morning,
But a birch canoe with paddles,
Rising, sinking on the water."

Seth Mindwell.

THE SANDPIPER.

The glitter of the sunlit river
In his flashing, fearless eye,
There on his unwearied pinions
See the bird go sailing by!

Slender, sword-like wings, and dainty,
How they cut the thin air now!
And without a trace of languor
Soars he to the mountain's brow.

Back again—for whim has moved him—
And where rippling water lies,
Scanning all the shore line closely,
Light as thistle-down he flies!

On the white sand scarce a footprint
Makes he, touching here and there;
Singing his two notes so gladly,
Ah, this bird is passing fair!

Sweet content in voice and motion;
Following splash of many a wave;
Or o'er pine that faces ocean
Mounts this rover, gay and brave!

—George Bancroft Griffith.

A BIT OF BIRD GOSSIP.

The sun shone brightly through the green leaves of the trees and crowned each tiny ripple on the lake with a glistening diamond. A Robin Redbreast hopped along the shore, picking up a few pebbles, for the poor thing has to wear her false teeth in her stomach, as it were, having no teeth in her head with which to chew her food.

There was a rush of wings above her and she dropped the grain of sand with which she had thought to fill up her gizzard, cocked her smooth black head on one side and watched the approach of another bird. Was it friend or enemy? It proved to belong to the aristocratic family of Thrushes—real high-flyers among birds—who alighted on the same sandy shore and advanced "with many a flirt and flutter" to greet her old friend, for they had been neighbors in the same sunny orchard the year before.

"So glad to meet you again, Mrs. Redbreast," said the gracious Thrush in a most musical voice, "but are you not a long way from the willows on the river bank where I last had the pleasure of seeing you?"

"Oh, we never finished that house among the willows. We became dissatisfied with the neighborhood," answered Mrs. Redbreast, after performing the graceful courtesy of a well-bred bird, as are all Robin Redbreasts.

"Ah, I was afraid of malaria when we looked the ground over together in the spring. It was too low, almost swampy. Mr. Thrush and I went to a little knoll about three miles away and built in the loveliest, the most fragrant wild crabapple tree you ever saw," and Mrs. Thrush smoothed with shining beak a mottled feather on her handsome breast.

"But would not those lovely blossoms tempt those creatures—boys, I think they are called—to climb until they found your home?"

"The thorns stand sentinel and the thick leaves hide it well, and I wanted my children to grow up strong, and swift on the wing. They would never grow up well feathered and beautiful amid those

lovely willows on account of the low ground," replied the Thrush.

"It was not malaria that caused us to abandon our half-built nest, but boys, some black as crows and some white as doves, kept coming to get materials for whistles. It seems that the very tree we chose had bark that slipped the easiest, and sometimes a flock of three or four would be perched on the limbs (they always sit astride, so awkwardly, you know), with jack-knives in their hands, and of course we could not stay. Robin wanted to come to the park—it is a lovely place—where those fine big creatures with bright stars on their gray coats are put to take care of us birds. Why," she went on, "they will not let boys stone even an English Sparrow, but I think that is altogether too particular. There comes a party of the little cockneys now," as a handful of winged brown balls came fluttering through the air close to the heads of the larger birds, who could easily have put them to flight if they would but try. However, they ducked their heads and scampered into the weeds, leaving the smooth shore to the new-comers, who dipped and splashed in the shallow edge of the lake as if they enjoyed it mightily.

"Just see the horrid little things washing themselves in water, but they never can get clean. Why, my Robin, who is a very venturesome fellow and sometimes follows the boulevards almost into the heart of the city, says that he has seen them in the dirty city streets washing themselves in the dust like common barnyard fowls."

"Don't let's look at them," exclaimed Mrs. Thrush. "They are doing it just because it looks respectable, and they know that we wash in water;" and the two birds spread their wings and swept disdainfully away from the neighborhood of the Sparrows.

"And where did you finally build, Mrs. Redbreast?" asked the other as they settled gracefully on the shore a half a mile away.

"Well, Robin, as I said, wanted very much to live in the park. He is so fond of company, but I told him there were too

many children on the grass. Why, they are as thick as dandelions any fine day, and in spite of the care of the great gray creatures it would be impossible to safely teach our children to fly. We finally found a lovely suburban place within easy flying distance of the park. An apple tree with perfect branches for a nest grew in the back yard, the cherry trees were white with bloom and the whole place fragrant with the blossoms of the grape. There was a flat jar always kept filled with water for the birds, with a stone in it that reached nearly to the surface on which to stand while bathing. The water made the birds come in flocks, so that the place was gay with songs, and really that yard was a little Eden. But you know," she went on, dropping her voice, "there is a story of something terrible that walked in the garden of Eden, and I think it was a black cat, for that is what walks in our garden. He lies on the back steps in the sunshine pretending to be asleep, but where his eyes ought to be in that big black ball he calls his head I can see a narrow yellow stripe, and out of that stripe of yellow he watches every bird that comes."

"Does he get any birds?" asked the Thrush in an awe-struck whisper.

The Redbreast shook her black head sadly. "Every now and then his mistress finds him with feathers in his whiskers, and she scolds him. But there is a serpent in every Eden," she added philosophically; "if it isn't cats it's boys."

"Did you ever hear what became of the family of Wrens that lived in the honeysuckle over the back door?" asked Mrs. Thrush, who cared more for gossip than moralizing. "They were so pleasant and cheery."

"Oh, yes. We started south before they left and I haven't seen them since. They were a proud little folk, that made believe they were not proud, always wearing the finest clothes, yet in such sober colors. I always called them stuck up."

"Their tails certainly were—he, he, he," giggled Mrs. Thrush.

"Ha, ha, ha," laughed Mrs. Redbreast. "That's pretty good. I must tell that to Robin. But don't you remember," she went on, "the Blue Jays that lived in the elm tree down the lane?"

"I never thought them very well-bred," replied Mrs. Thrush, bridling prettily, for she and her family pride themselves on their correct behavior. "Wonderfully pretty, but too loud."

"Altogether too gay and noisy. Mrs. Jay was a great scold, and Blue almost as bad. You could hear them all over the neighborhood. Well, they lost all their children by a Hawk, though Mrs. Jay fought bravely for her little ones, and Blue proved himself a real hero. She over-exerted herself, however, and died shortly after of nervous prostration. I saw a girl, who had found her body, spreading out her poor dead wings and holding them up against her hat. She finally wrapped Mrs. Jay up in her handkerchief and carried her away."

"If women would only be satisfied with the wings of a bird that had died a natural death we would not complain," said Mrs. Thrush, as she folded her own pretty wings a little closer. "Blue Jay married again right away, of course," she went on, as she dropped a little red ant down among the mill stones of her gizzard to be ground up.

"He did not even wait the conventional two weeks. If I thought Robin Redbreast would be looking out for another housekeeper so soon after my death he would not have such a good wife as he has to-day. He would have to hunt more worms and bugs than he does, instead of just bringing home a little bit of dessert in the shape of cherries or grapes to please the children;" and the mother fluffed up her feathers alarmingly.

"That makes me think," said Mrs. Thrush, "that I promised the children an especially nice supper to-night if they would not chirp or stick up their heads and look over the edge of the nest. They are really getting so big now that Mr. Thrush and I can do nothing with them. Last night when I went home I found my eldest son, Brown Thrush, sitting on the edge of the nest, and he is taller——"

Just then a large shadow wavered over the sunshiny sward, and with a scared exclamation of "Hawk!" the birds flew swiftly in different directions, not waiting to see that the object which cast the shadow was nothing but a harmless paper kite.

S. E. McKee.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



FROM COL. CHI. ACAD. SCIENCES.
3/16

MARBLED MURRELET.
(*Brachyramphus marmoratus*.)
About $\frac{1}{2}$ Life-size.

COPYRIGHT 1901, BY
A. W. MUMFORD, CHICAGO.

THE MARBLED MURRELET.

(*Brachyramphus marmoratus.*)

This little bird belongs to the family of auks and puffins, the guillemots and the dovekie. It is the sea bird family (Alcidae) for all the species are maritime, spending most of their time on the ocean. Nearly all the species frequent the Pacific coast of North America. A few are, however, found on the Atlantic coast. They seem to frequent the wildest and most rocky shores and generally congregate in large colonies which may include several species. Their structure unfits them for locomotion on the land where they move in an uncouth and awkward manner, but they are agile and quick swimmers and expert divers. It is said that they will remain under water for several minutes, swimming for long dis-

tances. They use their wings in diving. The Marbled Murrelet inhabits the coast of the Pacific ocean from San Diego, California, northward, breeding only in the northern part of its range. These birds are seldom found at any great distance inland. It is said that their nests, like those of the petrels, are built in holes in banks or in burrows in the ground. They have also been known to lay their eggs in the open crevices of cliffs where but little effort is made to build a nest other than the gathering together of a few sticks and twigs.

The ovate eggs are of a buffy color and are marked with varying shades of brown.

BEFORE THE STORM.

A whirl and sweep of snow-white wings,
Soft brown-flecked breasts, now here, now there
A-sway upon the ragged weeds
Or darting through the wintry air.
I watch you from the frosted pane
Beside the glowing hearth-stone warm,
And shudder as I hear the wail
Of angry winds before the storm.

—Mary Morrison.

BOY-CHICKADEE.

I doubt if any one was ever haunted by a more commonplace object than a fence-post; yet, terminating a fence that borders a little farm, there is a gray old post which has haunted my imagination for several years. The fence has long ceased to fence anything in or out; the uppermost rail is the only one left and that is fastened to my post about five inches from the top. Just under the lee of that rail is a round hole which is rather jagged about the lower edge as if gnawed by sharp little teeth. Every time I travel that road I am impelled to stop and put a finger into that hole. I always expect to discover a secret, yet never do. Still, the post haunts me for once Boy-Chickadee kept house there.

Boy-Chickadee is one of our smallest birds. He wears a dumpy little gray coat surmounted by a pair of bright black eyes under a velvety black cap. Dear to the heart of every bird-lover, he is especially so in winter. It is then that his crystal pendulum of song swings lightly to and fro where other bird-song is rare. It is rather plaintive—two minor notes swing to the left, then two more to the right—and seems to belong only to frosty mornings. Boy-Chickadee stays to wish you "A Merry Christmas" and "A Happy New Year," and comes daily to dine on sunflower seeds stowed in a large gourd for him. I should be ashamed to say how many seeds he consumes at a sitting, or flitting better describes it. He flits in for a seed, then out to the apple-tree to hammer it, uttering gurgles of content all the while. He spends so much time eating them that I eye my store anxiously wondering if it will hold out under such onslaughts. Sometimes he brings a companion and they take turns going into the gourd. His British enemies tag him enviously and hang about the gourd-door; but it is cut too small for them and they can only gaze in. It is Boy-Chickadee's cache.

In summer time Chickadee deserts us and we must seek him in the fields, and that is how we came to find the fence-

post. We sat waiting for birds to bathe, but waited in vain. They bathed upstream and they bathed down-stream. We saw them drying their feathers, but they would not bathe by us. A dripping Chickadee flew overhead and sat preening his feathers in a sweetgum tree. How nearly we had come to seeing that bath! (a thing we had never achieved). In despair we crossed the road and hid behind the sassafras hedge. Presently something strange passed us and there was Dame Chickadee with a very queer burden. Imagine yourself with a mouthful of excelsior larger than your head, and you will have some idea of her comical appearance. She peered at us from behind her treasure first with one eye and then with the other. We were all attention. A dozen times she darted towards the old fence, but we were too alarming and she could not make up her mind to brave us. Each time she retreated to the sweetgum, holding tight to her bundle—it might have been a clematis blossom, I could not say. It was the first time I had ever seen a Chickadee look self-conscious. At the same time we saw that Boy-Chickadee had dipped in once more and was dripping wet. It was maddening. At last she made a wide curve towards us and disappeared. I sprang to the fence-post and discovered the round hole, and with an ecstatic catch of the breath I put one finger in. A bunch of indignant feathers hurled itself against my hand and out came the finger and out came she and whisked away with such lightning rapidity that we barely saw her. The hole was too deep and too well shadowed to tell us anything more than that it had a secret in its keeping and although we should have liked to camp by the post it was not to be.

At our next visit we found Dame Chickadee setting and Boy Chickadee feeding her; again, and the post had become a nursery. It seemed too ludicrous that such babes-in-the-woods should ever attain to the dignity of fatherhood and motherhood; but this time neither parent

was there to be laughed at, and as I tapped at the door a perfectly intelligible "Day-day-day-day" came from the nursery; the babes had already learned to talk!

It was so long before we visited them again that we expected to find the post deserted. There was no sign of occupancy and I felt depressed because it was all over. But a gentle tap brought a tiny, angular cranium and a careworn baby face to the door. It didn't seem possible that Boy Chickadee could have such a homely bairn! We withdrew in haste when he threatened to come out; but we

had summoned him and the moment had come to seek his fortune. The youngster stepped into the door and set sail straight across the wide roadway. When we caught a rear view of the tiny sailboat our gravity was undone, for not a vestige of tail adorned it and he was the most unfinished fledgling we had ever seen.

This was the last sign of life the old fence-post yielded, but I cannot learn to believe it final. I am constantly expecting to see more Chickadees set sail, and its possibilities still haunt me.

Elizabeth Nunemacher.

THE STORY BIRD.

The parrot has been called the "bird-man" on account of its intelligence; but so many anecdotes are told of it that it might well be styled the Story-bird.

Of the four hundred and thirty different species known, America claims one hundred and twenty-six. Europe is the only large country that does not possess native tribes of parrots.

The parrot is the monkey of the feathered world, because of his imitative powers. He also uses one of his feet as a hand to carry what he eats to his beak.

A parrot possessed of remarkable linguistic powers, being able to speak in Spanish, Portuguese, French, German and English, was accustomed whenever a visitor was at all boisterous to imitate his laugh and then groan in anguish, ex-

claiming in tones of commiseration, "Poor, poor Polly!"

A cardinal is said to have paid a hundred crowns for a parrot that could recite without a blunder the Apostles' creed and chant the Magnificat correctly.

An attempt was once made to reform a bad parrot which kept saying, in reference to his mistress, "I wish the old lady would die."

The curate sent over his own bird, that had been religiously trained, hoping its influence would have a good effect on the bad bird. But whenever the latter said, "I wish the old lady would die," the clergyman's bird rolled up its eyes and exclaimed, "We beseech Thee to hear us, good Lord."

Belle P. Drury.

THE BEAR.

Though the Bear is classed with the Carnivora, or flesh-eating animals, it is really omnivorous in the best acceptance of that word, for it will thrive on a vegetable diet for many weeks at a time. Bears will devour the various kinds of berries, grains, the succulent leaves of herbs and the fleshy roots, with evident relish. There is, perhaps, no more dainty morsel for them than the young and tender buds of trees and shrubs as they are prepared by Nature, wrapped in their winter covering and containing an abundant food, stored there for the nourishment of the growth of the coming season—a food useful to the animal as well as the plant. The young seem to depend entirely on vegetable food, but as they grow older, though still preferring the products of the plant, they will eat a variety of animal forms, such as insects, mollusks, crustaceans, worms, birds and their eggs. When driven by hunger they will kill and eat larger prey, such as deer and domestic cattle. They will also devour the dead bodies of animals freshly killed, but only before there is any taint or odor. Thus, though Bears have the structural characteristics of the flesh-eating animals, this classification is misleading to the untutored observer who watches them in our menageries or even in their native homes.

The Polar Bears are perhaps the most carnivorous of them all, living almost entirely on animal food, when in their natural homes. The Grizzly Bear is also a flesh-eating species, though it will subsist on a vegetable diet. It is an interesting fact that the nature of their food seems to determine the degree of strength and the ferocity that they possess. The influence of the diet is shown not only on the various species but also upon the individuals of the same species. The Bears fed only upon vegetable foods exhibit a much milder disposition and are less resentful when crossed.

Bears are distributed throughout the

world except in Australia. In the words of Brehm, "They inhabit the warmest as well as the coldest of countries, high mountains as well as the coasts of the Arctic Sea. Nearly all species select dense, extensive forests or rocky regions, generally lonely spots. Some delight in watery or damp situations, streams, rivers, lakes, swamps and the sea, while others prefer stretches of dry land. One species is confined to the sea-coast and seldom penetrates the depths of the continent, but still undertakes more extensive migrations than the others, traversing great distances on drift ice, crossing the northern Arctic Ocean and migrating from one continent to the other."

Besides the bears of the present day there are extinct forms, remains of which occur in the later geologic ages. The Great Cave Bear, remains of which have been found in the caves of Central Europe, indicate that this species was even larger than our Polar Bear, which may measure nine feet in length.

The opinion is prevalent that the movements of the Bear are awkward and slow and that they are neither fleet nor active in locomotion. This is true, to a certain extent, in the case of the larger species, though they are endowed with great endurance. On the other hand the smaller species are notably quick and active in their motions. In fact all species when excited will pass over the ground at a rapid rate, their strides resembling a sort of gallop. All climb, especially when young or until their great weight prevents them from doing so.

A few of the species are excellent swimmers and can remain under water for some time. The Polar Bear well illustrates this characteristic, for it has been seen many miles from the shore, swimming easily and showing a wonderful power of endurance.

We are told that "some species are sensible and sagacious and may be trained



BLACK BEAR.
(*Ursus americanus*.)
Greatly reduced.

FROM COL. JOSEPH STEPPAN.
5317

LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO

to a certain extent; but they exhibit no high mental development. Some individuals become very tame, though they display no particular affection for their master and keeper. They always revert to their grosser animal instincts in old age, for then they become wicked, intractable and violent. The Bears signify their various moods by modulations of their remarkable voices, finding utterance in dull growling, snorting and murmuring, or grunting, whistling and sometimes barking sounds."

A family of young Bears consists of from one to six, which are fed and protected in the most tender manner by their watchful and careful mother. Born naked and blind, it is usually five or six weeks before they can see and have a seasonable coat of hair. After this, they are full of life and very playful, and their antics are very amusing.

Bears may be classed under three groups; the Sea Bears, the Land Bears and the Honey Bears.

The Polar or White Bear is the only representative of the first class. This species has been wonderfully provided for by Nature. Living as it does in the regions of perpetual ice and snow, the pure white color of its fur becomes a protection, as it is less easily observed. It also, unlike the other species, has the soles of its feet covered with hair which enables it to move more freely and safely on the ice. They have been noted at a distance of fully fifty miles from the nearest shore, swimming without effort and showing no fatigue.

One of the best known of the Land Bears is the Brown Bear of Northern Europe and Asia. It varies greatly and some authorities divide it into several distinct species. It is easily tamed and be-

cause of the ease with which it supports itself on its hind feet it is often taught to step to the sound of music. Here also is classed the Grizzly Bear, which is nearly as large as the Polar Bear and much more ferocious. It has been known to attack the bison and carry a body weighing one thousand pounds or more to its den some distance away.

The Black Bear of our illustration is also a member of this class. It is a native of the wooded parts of North America. This species is timid though agile, strong and is of great endurance. Its fur is soft and even and shining black in color. It can run more swiftly than can a man and will escape in this manner if possible.

Though it principally feeds on herbs, fruits and grains, it will also devour live stock of the smaller kinds and may even attack cattle. In captivity they are much better natured than the other species. "They never make hostile use of their strength in their relations with their keepers, but completely acknowledge human supremacy and present no difficulties in their training. At any rate, they fear their keeper more than he does them."

The third class is illustrated by a single species, the Sloth, or Honey Bear, also called the Aswal. It is a native of India and frequents hilly localities. It feeds upon fruits, honey and the lower animals, such as ants and the grubs of various insects. It also enjoys the comb and honey of bees. With its large and scythe-shaped claws it will destroy the strongly built homes of the white ants. In its native country the Sloth is trained by jugglers to perform many tricks and in captivity it is docile and comparatively good-natured.

BIRD INCIDENTS.

Wrens versus Sparrows: Some time since in the early spring, a pair of English Sparrows made up their minds to take possession of a bird house in our garden which a pair of Wrens had occupied for two previous years.

Mr. and Mrs. Wren had not yet arrived, so there was none to dispute the sparrows' right or suspend operations. All went well and the nest was nearing completion, when one bright sunny morning, the former occupants arrived on the scene and trouble at once began. They evidently resented the action of the sparrows in taking the house which they anticipated using for a summer residence. An indictment of evacuation was at once served and being met by a show of sparrow impudence, forcible expulsion was next in order.

Mr. Wren took up his position on the front porch of the little house, and by a series of savage attacks and much loud scolding, succeeded in keeping the pair of sparrows off, while Mrs. Wren, working with desperate determination, proceeded to tear the nest apart and carrying the materials out the little back door, scattered them in all directions. My! what a shower of hay, straw, feathers, sticks, etc. This was continued until the house was entirely cleared. Then, without delay, began the process of reconstruction. During this time the sparrows did not sit idly by and see their work destroyed, but there was a continuous battle between them, and when the action became too pressing, both Wrens would make a grand charge which invariably resulted in driving the enemy back. By and by the new nest was finished, and although bad feeling existed for several days afterward, with frequent passages at arms, the sparrows finally gave up the fight as hopeless, and Mr. Wren mounted

the chimney, standing guard, and at the same time giving vent to his feelings in loud and spirited song. Of course, our sympathies were with the victors.

Cat Bird and Cherry Stone: During one of my many rambles through the woods, I discovered the nest of a Cat Bird in a thick clump of briars and upon drawing near found it contained four little ones. Retreating for a short distance, I stopped and watched the mother bird who was greatly excited at first, but seeing that I meant no harm to her little family, she proceeded with household matters.

After giving the young ones two or three worms and other choice morsels, she brought a good-size red cherry and offered it to one of the nestlings. The little bird could not swallow it, so what did the mother do but take the cherry out of its mouth, remove the stone with her beak and feet, and then give it back to the nestling in a crushed state. This time it disappeared in a trice. The incident impressed me as being not only amusing but an excellent illustration of "bird sense."

Chippies Dividing Crumbs: While sitting under a shade tree in the yard, I observed a pair of Chippies eating two crumbs of bread. One crumb was much larger than the other, and of course the bird having the smaller one finished first. Then what! Simply this, the other Chippy at once broke his crumb in half and proceeded to place a portion of it within reach of his mate. In this way each had nearly an equal amount. Beautiful incident; well might man take this lesson home to himself; what an exhibition of love and generosity; what a different world this would be if people acted more on the principle of these innocent little birds!

Berton Mercer.

SEA-MEWS IN WINTER TIME.

I walked beside a dark gray sea,
And said, "O world, how cold thou art!

Thou poor white world, I pity thee,
For joy and warmth from thee depart.

"Yon rising wave licks off the snow,
Winds on the crag each other chase,
In little powdery whirls they blow
The misty fragments down its face.

"The sea is cold, and dark its rim,
Winter sits cowering on the world,
And I, besides this watery brim,
Am also lonely, also cold."

I spoke, and drew toward a rock,
Where many mews made twittering
sweet;
Their wings upreared, the clustering
flock
Did pat the sea-grass with their feet.

A rock but half submerged, the sea
Ran up and washed it while they fed;
Their fond and foolish ecstasy
A wondering in my fancy bred.

Joy companied with every cry,
Joy in their food, in that keen wind,
That heaving sea, that shaded sky,
And in themselves, and in their kind.

The phantoms of the deep at play!
What idless graced the twittering
things;

Luxurious paddlings in the spray,
And delicate lifting up of wings.

Then all at once a flight, and fast
The lovely crowd flew out to sea;
If mine own life had been recast,
Earth had not looked more changed
to me.

"Where is the cold? Yon clouded skies
Have only dropped their curtains low
To shade the old mother when she lies,
Sleeping a little, 'neath the snow.

"The cold is not in crag, nor scar,
Not in the snows that lap the lea,
Not in yon wings that beat afar,
Delighting, on the crested sea;

"No, nor in yon exultant wind
That shakes the oak and bends the
pine.
Look near, look in, and thou shalt find
No sense of cold, fond fool, but
thine!"

With that I felt the gloom depart,
And thoughts within me did unfold,
Whose sunshine warmed me to the
heart:

I walked in joy, and was not cold.

—Jean Ingelow.

SNAILS OF POND, RIVER AND BROOK.

Many of my readers have doubtless kept an aquarium at some time in their life and have stocked it with several goldfish, a small turtle and some fresh water snails. They have also, without doubt, stood in front of the aquarium and watched the strange antics of each of the three kinds of animals and have wondered at the swiftness with which the little snails progressed about the glass sides of the artificial pond. It is of these molluscan denizens of fresh water that I shall write in this article.

In the fresh-water species the shell is not often rounded like that of the land snails, but is more frequently long and pointed, the spire resembling a church steeple. The animal, too, differs very greatly, the tentacles being either flat and triangular or long and very tapering. The eyes are not placed at the end of the eyepeduncles, as in the land shells, but are generally situated on little swellings at the base of the tentacles. They may be found in almost any body of water, adhering to stones, sticks, and other submerged objects, or crawling over the sandy or muddy bottom.

Our fresh-water snails may be divided into two classes; first, those which breathe by means of a lung and which must come to the surface at regular intervals to take in a supply of air, and, second, those which breathe by means of plume-like gills which take the oxygen directly from the water.

One of the most common and best known of the first class is the Limnaeidae, comprising the pond snails. These animals have generally a long, graceful shell, horn-colored for the most part, but sometimes greenish without and reddish within the aperture. The animal has a broad, flat foot, an auriculate or eared head, and flat, triangular tentacles. The habits of these animals are very interesting. They will wander about the sides of an aquarium, eating the growths of green scum which have collected. At this time the mouth may be seen to open, exposing the

radula and the operation of eating is not unlike the motions of a cat lapping milk. They are such voracious eaters that the dirtiest aquarium will be cleansed by them in a very short time. It is interesting to note that the young animals breathe air through the water for a long time, and finally acquire the normal characteristic of the family of breathing the air directly. While submerged, the mantle chamber containing the "lung" is tightly closed so that no water can possibly get in. It is thought by some that the species of *Limnaea* living at great depths retain the early habit of allowing the water to fill the mantle cavity and so breathe oxygen through the water and are not, therefore, compelled to come to the surface for air.

Limnaea lives under many varying conditions, being found in the arctic regions of Greenland and Iceland as well as in the tropics, in thermal springs and those containing mineral matter, as sulphur, as well as in brackish and fresh water. They have been found at a height of over fourteen thousand feet in Thibet and at a depth of eight hundred feet in Lake Geneva, Switzerland. During times of drought when the streams are dried up and the surface of the mud is sun-cracked, the species of this family bury themselves deeply in the mud and cover the aperture with an epiphragm, in much the same manner as the land shells. This fact accounts for the apparent disappearance of all life from a pond when it dries up, and its sudden and seemingly unaccountable reappearance when the pond is again filled with water.

A genus of pond snails closely allied to *Limnaea*, but having discoidal or spiral shells, is *Planorbis*, the flat-orb shells. Instead of dragging their shells after them, as in the last genus, they carry them perfectly perpendicular, or perhaps tilted a little to one side. The animals are very rapid in movement, more so than *Limnaea*, which are rather sluggish. They delight in gliding rapidly about,

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



LAND AND RIVER SHELLS.

Physa gyrina (U. S.)
Pleurocera elevatum (U. S.)
Vivipara conctoides (U. S.)

Melania tetrica (Viti Islands.)
Planorbis trivolvis (U. S.)
Ampullaria depressa (U. S.)
Campeloma subsolidum (U. S.)

Angitrema verrucosa (U. S.)
Limnaea stagnalis (U. S.)
Limnaea megasoma (U. S.)

their long, filiform tentacles waving about like a whip in the hands of an impatient driver.

The Limnaeas of which we have been speaking have mostly dextral or right-handed shells, that is, have the aperture on the right side when you hold the shell in the position pictured on our plate. In the family Physidae the shell is left-hand or sinistral. The members of this family have shining, horn-colored shells, more or less fusiform. The tentacles are long and filiform and are constantly moving about as in the allied genus Planorbis. The animal is very active and moves about with a steady, gliding motion. It is very interesting to watch a number of Physae in an aquarium; as they are crawling along the bottom, one will be seen to rise suddenly to the top of the water and move along with the foot applied to the surface, the shell hanging down. Again, they may be seen descending, suspended by a thin thread of mucus. When the animal rises suddenly, the branchial cavity which contains the lung is heard to open with a faint, clicking sound, which is probably due to the pressure of air in the lung being suddenly liberated. Several of the species of Physa inhabit water as cold as the freezing point and they may be frequently seen in winter gliding over the bottom of a stream or pond when the surface is frozen. The little glairy, transparent masses of jelly-like matter which are seen attached to stones and the under side of sticks, are the eggs of Physa or Limnaea.

Not all of the fresh-water pulmonates have spiral shells. A whole family, the Ancyliidae, have a conical shell formed like a rounded shield, and resembling the limpets, hence called the river limpets. They are generally quite small and live attached to the interior of dead river shells and to submerged plants and to rocks. They are very interesting, but hard to find on account of their small size and inconspicuous habitat.

The second class of mollusks or those that breathe air through the water, have a respiratory cavity instead of a lung, in which is placed a series of leaflets, arranged like the teeth of a comb in two series of lines, forming the so-called gills. The mouth, also, is placed at the end of

a long rostrum, or proboscis, and not in the lower plane of the head, as in the first class. Among the most common of this class are the river snails, known as Strebomatids. There are about three hundred species in this family, and with two or three exceptions they are confined entirely to the United States in geographical distribution. The shells are more or less graceful, having long, turreted spires and small apertures. The color of the shells is generally a uniform greenish or yellowish, although some species have color bands, and the aperture is frequently tinged with purple or reddish.

The animal is very interesting in captivity. It is not very bold and will lie on the bottom of an aquarium with its head and foot half protruding from its shell, and its rostrum and tentacles slowly moving about. Frequently it may be seen moving along with its head and rostrum bent down and moving about like a hound on the scent.

A family closely allied to the last is the Melaniidae, the animals of which inhabit the entire world, except North America. They may be distinguished from the last family by the presence of little finger-like digitations on the edge of the mantle. The shells are generally larger and more highly colored than those of the last family, many of them being of a dark chocolate color and some are of a beautiful glossy black; some shells are smooth, while others are ornamented by knobs and spines. The genus Melania, a species of which is illustrated on the plate accompanying this article, is the most characteristic form.

The largest and handsomest of the fresh-water snails belong to the two families Viviparidae and Ampullariidae, the shells of the latter family frequently attaining a length of three inches. The animals of the first family prefer a sandy beach in a large lake or river, while those of the second generally live in more or less muddy rivers, ponds and creeks. A single genus of Viviparidae (*Campelona*) is confined solely to the United States, east of the Rocky Mountains. Their shells are generally of a rich grass green and in certain localities they may be collected by the thousands. Unlike many of the snails of which we have been writing,

this family is viviparous, that is, brings forth its young alive, instead of laying eggs, as in the family Limnaeidae. This character has given the family its name, which is certainly well chosen. When born the shell is about one-sixteenth of an inch in length and is perfectly transparent. The animal is very active and eats voraciously of any vegetation within reach. Another handsome shell belonging to this group is the *Vivipara contectoides*, which is about an inch in length and is encircled by several color bands. It is a common shell in many of our ponds.

Somewhat larger and handsomer than the *Viviparas* are the *Ampullarias*, or apple-shells (also called idol-shells and pond snails). These animals live mostly in tropical and subtropical regions and are noted for the tenacity with which they retain their hold on life. So tenacious of life are they that instances are known of their living for several years away from the water, in this respect resembling some of the land snails. It is also recorded that hollow pieces of logwood from Honduras have frequently contained specimens of this family alive after a journey of thousands of miles. They may be said to be truly amphibious.

The writer has collected in Florida the large *Ampullaria depressa* in considerable numbers. It was noted particularly that this species furnished the principal food of the Everglade Kite, a bird inhabiting the southern part of Florida. Large quantities of these shells were found about the nesting places of these birds, from which the animal had been neatly extracted without damaging the shell in the least. The bird is, curiously enough, provided with a curved bill which easily fits into the aperture of the mollusk and extracts the animal with little difficulty, and the feet and claws are so constructed that the shell may be firmly held during the operation. This shell is figured on the plate.

In Central Africa there is a lake, Tanganyika, having a length of four hundred miles and a width of from ten to fifty miles, and at an elevation of twenty-seven hundred feet above sea level, which has one of the most interesting and peculiar fresh-water molluscan faunas known. It

is thought that at some remote period in geological history this lake formed a part of the ocean and that in the course of time it was cut off from the sea, gradually became fresh and was finally raised to its present elevation. The reason for such a theory is the presence in the lake of certain molluscan organisms whose shells closely resemble those of the salt water family, Littorinidae (Periwinkles). The fact that certain species of the family inhabit brackish water and are even subject to the influence of fresh water, adds additional weight to this theory. The shell of this species (*Limnotrochus thomasi*) also resembles certain of the top-shells (*Trochus*), which are marine in habitat. Most of the other species inhabiting this lake are like the fresh water *Viviparas* in form.

The animal of *Ampullaria depressa* is very curious and interesting when studied alive. The foot is very wide, almost square in some positions; the head is narrow, separated from the body by a neck and the region of the mouth is produced into two long, cylindrical, tapering, tentacular processes, which are probably tactile organs like the elongated lips of *Glandina*, described in the last article. On the top of the head are placed the two whip-like tentacles, which are longer than the length of the whole animal and are always waving about when the animal is in motion. Just back of the tentacles the eyes are placed at the end of two short, rounded prominences or peduncles. From the left edge of the aperture extends the long, hollow, cylindrical siphon formed by two extensions of the mantle. On the upper side of the posterior end of the foot is placed the horny, concentric operculum or door. When the animal withdraws into its shell the head first disappears with its appendages and the siphon, and the foot is doubled up in the middle, the operculum shutting in last and closing the interior against all enemies.

All of the different groups of the mollusca have their giants and their pigmies and the fresh-water mollusks are no exception to the rule. We have thus far studied the animals of normal size and the giants. Let us now turn our attention to some of the pigmies among the fresh-

water snails. One of the commonest of these small mollusks is the *Bythinia tentaculata*, the shell of which does not exceed half an inch in length, and is formed in a graceful, tapering turret. This species, like many other European animals, has been introduced into this country and bids fair to eclipse many of the native species in the number of individuals. It probably first came over with some merchandise, which was shipped west by the way of the Erie canal. The snail, once established in the canal, has had every opportunity to spread over the entire United States. The canal is emptied every year and cleaned and the water, with its organisms, is allowed to flow into the little streams and the larger rivers and thence into Lake Ontario. From this lake this species has spread so that it is also found in Lakes Erie and Michigan, and will eventually spread over the entire northern portion of the United States. This is but one of the many examples of different species being carried by human agencies from one part of the world to another.

But there are many species of these smaller fresh-water snails that are pigmies, indeed, whose tiny shells do not exceed an eighth of an inch in length and which require the aid of a microscope to adequately study their delicate organisms. These minute animals live on water plants and on any submerged object. They vary from long, pointed, steeple-like shells to those which are perfectly rounded like a miniature apple. In our own country these little creatures may be found in any of our ponds or streams, and the lively little animals are well worth a closer acquaintance. They are known scientifically under the difficult names of *Paludinella*, *Amnicola*, *Somatogyrus*, *Fluminicola*, with many others, and do not bear any specific English titles.

Much more might be written concern-

ing the habits and variations of the fresh-water snails. The best way to become acquainted with these interesting animals is to collect them alive and study their various modes of life in an aquarium. This receptacle need not be an elaborate or expensive affair. A fish globe six or eight inches in diameter makes an admirable aquarium and even a quart Mason fruit jar has been successfully used by the writer. The bottom should be covered to a depth of an inch or more with clean, fine sand and several stones should be introduced for the snails to "roost" upon. If the aquarium is large enough a few water plants like water cress might be introduced to assist in purifying the water.

The best Mollusks for this purpose are the *Limnaea*, the *Planorbis*, the *Physa*, the *Vivipara* and some of the "pigmies" just mentioned. Much can be learned concerning the habits of our common snails if a record is kept of everything the animal does, such as its mode of eating, what it will eat and the increase in size from day to day of the little snails after they are hatched from the egg. If these creatures could be considered by the majority of people as living, breathing animals, performing many of the functions carried on by our own bodies they would be regarded with more favor and hence aquaria would become more numerous and they would also be studied more intelligently. The writer has been frequently amused (and sometimes pained) by the careless question of some otherwise intelligent person, when he has been exhibiting the shell of some interesting mollusk, "Well, really, now, was that thing ever alive?" It is to be earnestly hoped that this series of articles will reach many of this class of people and lead them to a better understanding of these lowly creatures.

Frank Collins Baker.

THE ORANGE.

(*Citrus aurantium*.)

The tree which produces the well-known Orange of commerce is closely related to the lemon, the citron and the lime, and with them belongs to the genus *Citrus*.

By some it is supposed that Linnaeus selected this name, deriving it from a corruption of the Greek word meaning cedar-tree, because, like the cedar, it is an evergreen. By others it is held that the name was chosen in honor of the city of Citron in Judea. In ordinary language the name citron is applied to another species of the genus, the fruit of which is oblong, about six inches in length and with a thick rind.

Many consider that the name Orange is a direct corruption of the Latin word *aureum*, meaning golden; but our best authorities on the derivation of words believe that the name, though a corruption, reached its present form in the following manner: "The Sanskrit designation *nagrungo*, becoming *narungle* in Hindustani, and corrupted by the Arabs into *naranj* (Spanish *naranja*), passed by easy transitions into the Italian *arancia* (Latinized *aurantium*), the Roman *arangi*, and the later Provincial Orange."

In regard to the original home of the Orange there is a great diversity of opinion, yet there is little doubt that it was in some portion of southern Asia. Both the Orange and the lemon were unknown to the Romans, hence they must have been indigenous in a country not visited by this people. The region traversed by them was great and they even penetrated India. They were a people who were inclined to please the palate and would surely have used the Orange and taken it home with them if discovered and would doubtless have recorded the finding of so important a fruit. These facts tend to prove that the Orange was not then cultivated in India unless in the remoter parts. Other portions of Asia were unknown to the Romans but, with the

exception of the southeastern portion, climatic conditions would not have permitted the growth of the Orange.

De Candolle, an eminent botanist and one the truthfulness of whose investigations cannot be questioned, held that the original home of the Orange was the Burmese peninsula and southern China. Throughout both China and Japan this fruit has been cultivated from very ancient times.

Though not found by the Romans in India it was later cultivated there and without doubt it was carried from there by the Arabs to southwestern Asia previous to the ninth century and from there into Africa and to some of the European islands. The Arabian physicians were familiar with the medicinal virtues of the Orange and have spoken of it in their writings. It was probably afterwards introduced into Spain and possibly to other portions of southern Europe by the same agency as it seemed to follow the spread of Mohammedan conquest and civilization. Thus in the twelfth century we find that the bitter Orange was a commonly cultivated tree in all the Levant countries. There is no reference to the sweet Orange in the literature of this time and it must have been introduced at a later period. It was certainly cultivated in Italy as early as the sixteenth century.

In more recent years the cultivation of the various varieties has spread throughout the world wherever the climate and the conditions of the soil will permit the ripening of the fruit.

Risso, in his valuable history of the Orange family, enumerates one hundred and sixty-nine varieties with distinct characteristics. Of these he classes forty-three under the *Citrus aurantium*.

Besides the sweet and bitter varieties the more common ones are the Mandarin Orange of China, a flat and spheroidal fruit the rind of which easily separates from the pulp; the Tangerine, which is



ORANGES (NAVEL).
(*Citrus aurantium*.)

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

very fragrant and originally derived from the Mandarin, and the Maltese or Blood Orange, commonly grown in southern Italy and notable for its deep red pulp. There are many other varieties that bear geographical or local names.

Few forms of plant life present to the beholder more beautiful characteristics than an Orange tree in full bearing. Such

a tree, in addition to the unripe and ripe yellow fruit has also numerous white flowers, which give off their wonderful perfume, and its symmetrically arranged branches are covered with rich dark green leaves. It is a tree that appeals not alone to the sense of taste but to the esthetic nature as well.

THE MUSICAL SWAN.

(*Cygnus musicus.*)

"What moonlit glades, what seas,
Foam-edged, have I not known!
Through ages hath not flown
Mine ancient song with gathered music sweet—
By fanes o'erthrown,
By cities known of old, and classic woods,
And, strangely sad, in deep-leaved northern solitudes?"

If those living Avian gems aglow amid the trees that form Earth's emerald diadem, are the jewels of Nature's crown, then is the great white swan afloat upon the ripples of her glistening lakes and seas, a shimmering pearl amid the chasing of her silver breastplate.

Yet it was not the beautiful Mute Swan, most beautiful, most stately, and most silent of all created beings, that typified to the men of old the reincarnation of the poet's soul; neither the Trumpeter, with its loud clarion, but the more slender Singing Swan of song and story, that "thro' its deathless music sent a dying moan." It was to this swan alone that the ancients could attribute the power of melody—the singular faculty of tuning its dying dirge from among the reedy marshes of its final retreat, where "in a low, plaintive and stridulous voice, in the moment of death, it murmured forth its last prophetic sigh;" and it was this swan, too, that inspired the philosopher Pythagoras to teach that the souls of poets passed at death into swans and retained the powers of harmony they had possessed in their human forms.

M. Antoine thinks that it is not im-

probable that the popular and poetical notion of the singing of the swan was derived from the doctrine of the transmigration of souls; yet the traveler Pausanias, who spake as one having authority, affirmed the swan to be "the glory of music," at the same time preserving the following testimony to the repute of the swan as a bird of prophecy: "In the night before Plato was to become the pupil of Sokrates, the latter in a dream saw a swan take refuge in his bosom. Now the swan has a reputation for music, because a man who loved music very much, Kuknos, the king of the Ligyes beyond the Eridanus, is said to have ruled the land of the Kelts. People relate concerning him that, through the will of Apollo, he was changed after his death into a swan." From this evidence Pausanias thus subtracts the weight of his private opinion: "I am willing to believe that a man who loved music may have ruled over the Ligyes; but that a human being was turned into a bird is a thing impossible for me to believe."

Mr. Rennie cites, also: "In his Phaedro, Plato makes Socrates thus express himself: 'When swans perceive ap-

proaching death, they sing more merrily than before because of the joy they have in going to the God they serve; but men, through fear of death, reproach the swans, saying that they lament their death and sing their grief in sorrowful tones.' After digressing to assert that no bird sings when either hungry or sorrowful, he resumes, 'Far less do the swans sing out of grief, which, by reason of their belonging to Apollo, are diviners, and sing more joyfully on the day of their death than ever before, as foreseeing the good that awaits them in the other world.'

Charles de Kay wrote: "Not the magnificence merely, but the element of superstitious reverence accounts for the frequency of the swan as a crest and charge of coats of arms," stating that in heraldry the swan runs back through heraldic devices to totemism, and that among the "oath-birds" which wizards of Lapland called upon in their incantations, the swan often figured.

It is also asserted that German local legends retain the idea of the swan as an uncanny bird, prophetic of death or the under world, and that the Klagesee, or Lake of Complaining, near Liban, was so named from the numbers of musical swans that congregated there.

Pliny says, "Some affirm that swans sing lamentably a little before death, but untruly, I suppose, for experience of many has shown the contrary." But Aristotle says, "Swans are wont to sing, particularly when about to die, and mariners in African seas have observed many of them singing with a mournful voice, and expiring with the notes of their dying hymn."

Cicero affirmed that Lucius Crassus spoke with the divine voice of a swan about to die; while Homer makes no allusion to their singing, but mentions their "flying round the springs of Cayster, clanging on sounding pinions." Oppian asserts, "They sing at dawn before the rising of the day as if to be heard more clearly through the still air. They also sing on the sea-beach, unless prevented by the sounds of storms and boisterous weather, which would not permit them to enjoy the music of their own songs. Even

in old age, when about to die, they do not forget their songs, though they are more feeble than in youth, because they cannot so well erect their necks and expand their wings. * * *

"They are invited to sing by Favonius, and as their limbs become sluggish and their members deficient in strength when death approaches, they withdraw to some place where no bird can hear them sing, and no other swans, impelled by the same cause, may interrupt their requiem."

While on the one hand Julius Scaliger vituperates Cardan for "lauding the nonsense of the poets, and the mendacity of the Greeks about the singing of the swan," Aldrovand cites on their behalf the testimony of one Frederico Pendasio, a celebrated professor of philosophy and a person worthy of credit, who told him that he had frequently heard swans singing melodiously while he was sailing on the Mantuan Lake; also that one George Braun had heard the swans near London "sing festal songs."

Besides this, Mr. Rennie says, Olius Wormius professed that many of his friends and scholars had heard them singing, and proceeded to give the experience of one John Rostorph, a student in divinity, and a Norwegian by nation. "This man did, upon his credit, and with the interposition of an oath, solemnly affirm, that once in the territory of Dronthen, as he was standing on the seashore early in the morning, he heard an unusual and sweet murmur, composed of the most pleasant whistlings and sounds; he knew not at first whence they came, or how they were made, for he saw no man near to produce them; but looking round about him, and climbing to the top of a certain promontory, he there espied an infinite number of swans gathered together in a bay, and making the most delightful harmony—a sweeter in all his life-time he had never heard."

To this testimony Goldsmith appends his personal opinion in the following words: "Thus it appears that our modern authorities in favour of the singing of swans are rather suspicious, since they are reduced to this Mr. George Braun and John Rostorph, the native of a country remarkable for ignorance and credul-

ity." Goldsmith's own belief was that the ancients had some mythological meaning in ascribing melody to the swan, "and as for the moderns, they scarcely deserve our regard. The swan must, therefore, be content with that share of fame that it possesses on the score of its beauty, since the melody of its voice, without better testimony, will scarcely be admitted by even the credulous."

This better testimony is furnished by Charles de Kay, who says that modern bird-lovers have heard the swans of Russia singing their own dirge in the North, when, having lingered too long before migration, reduced in strength by lack of food, and frozen fast to the ice where they have rested over night, they clang their lives out, even as the ancients said.

Inasmuch as we have record of the Singing, or Whistling Swan from Egypt to Alaska and the Aleutian Isles, with testimony of modern scientists as well as ancient poets in proof of the vocality of this, the largest of singing birds, the question becomes one of quality of song rather than of the actuality of the song itself. M. Montbeillard's opinion of the whistler's vocal exertions is thus expressed: "The bursts of its voice form a sort of modulated song, yet the shrill and scarcely diversified notes of its loud clarion sounds differ widely from the tender melody, the sweet, brilliant variety of our birds of song." And M. Morin even composed a memoir, entitled "Why swans that sang so well in ancient times now sing so badly." It is probable that the ancients, with due consideration for the difference in size between the swan and all other songsters, may have also given consideration in the same ratio to the theory of the enchantment that distance lends; and it is more than probable that all of this confusion of testimony resulted from confusion of species; for, as Charles de Kay explains, observations of the Mute Swan caused people to assign the song of the dying swan to the most fabulous of fables; while Hearne, who observed the Trumpeter, makes the following vigorous statement: "I have heard them in serene evenings, after sunset, make a noise not very unlike that of a French horn, but entirely divested of

every note that constituted melody, and have often been sorry that it did not forebode their death."

Aldrovand, referring to the structure of the organs of voice as countenancing the poetical creed of the singing swan, says, "For when we observe the great variety of modulations which can be produced from a military trumpet, and, going upon the axiom that Nature does nothing in vain, compare the form of such a trumpet with the more ingenious mechanism of a swan's windpipe, we cannot but conclude that this instrument is at least capable of producing the sounds which have been described by the ancient authors."

In distinguishing between the Whistling and Tame or Mute Swans, Bingley describes this strange form of windpipe, "Which falls into the chest, then turns back like a trumpet, and afterwards makes a second bend to join the lungs. The curve being inside the neck of the Whistler or Hooper, instead of being an external adornment, as in the case of the graceful Mute, in whom

'Behold! The mantling spirit of reserve
Fashions his neck into a goodly curve,
An arch thrown back between luxuriant
wings

Of whitest garniture, like fir-tree boughs,
To which, on some unruffled morning, clings
A dusky weight of winter's purest snows—'

while with the Musical Swan the gift of voice is balanced by a corresponding detracting from personal appearance; for the straight neck and smaller stature impart, we are told (alas!), a certain goose-like suggestion."

This aesthetic obstacle is, however, successfully surmounted by the fact that their songs are uttered mostly at night, when flying far overhead in the darkness; but there is no help for the statement of Albertus Magnus, which must needs be taken for better or for worse, that "When swans fight, they hiss and emit a sort of bombilation, not unlike the braying of an ass, but not so much prolonged."

The Abbe Arnaud, whose observations were said to be very minute, completes the list of odious comparisons as follows: "One can hardly say that the swans of Chantilly sing; they cry, but their cries are truly and constantly modulated; their

voice is not sweet; on the contrary, it is shrill, piercing, and rather disagreeable. I could compare it to nothing better than the sound of a clarionet winded by a person unacquainted with the instrument."

Proceeding then to depict the manner of their dual concerts, he continues: "The swan, with his wings expanded, his neck stretched and his head erect, comes to place himself opposite to his mate, and utters a cry to which she replies by another which is lower by half a tone. The voice of the male passes from A to B flat; that the female from G sharp to A. The first note is short and transient, and has the effect which our musicians call sensible, so that it is not detached from the second, but seems to slip into it. This dialogue is subjected to a constant and regular rhythm, with the measure of two times. Observe that, fortunately for the ear, they do not both sing at once!"

Nuttall is likewise arrayed with the witnesses for quantity rather than quality of sound. Of the dying song, he says, "These doleful strains were heard at the dawn of day or when the winds and waves were still, and, like the syrinx of Pan, were in all probability nothing more than the murmurs and sighs of the wind through the marshes and forests graced and frequented by these elegant aquatic birds." Speaking of the natives of Iceland comparing their notes, "very flatteringly," to those of a violin, he suggests that "allowance be made for this predilection, when it is remembered that they hear this cheerful clarion at the close of a long and gloomy winter, and when, at the return of the swan, they listen to the harbinger of approaching summer; every note must be, therefore, melodious, which presages the speedy thaw and return of life and verdure to that gelid coast." He adds that it emits its notes only when flying or calling on its companions—the sound being very loud and shrill, but by no means disagreeable when

heard high in the air and modulated by the winds."

Of the "Peaceful Monarch of the Lake," Thomas Bewick wrote: "Much has been said, in ancient times, of the singing of the Swan, and many beautiful and poetical descriptions have been given of its dying song. 'No fiction of natural history, no fable of antiquity, was ever more celebrated, oftener repeated, or better received; it occupied the soft and lively imagination of the Greeks; poets, orators, and even philosophers, adopted it as a truth too pleasing to be doubted.' 'The dull, insipid truth,' however, is very different from such amiable and affecting fables, for the voice of the swan, singly, is shrill, piercing and harsh, not unlike the sound of a clarionet when blown by a novice in music. It is, however, asserted by those who have heard the united and varied voices of a numerous assemblage of them, that they produce a more harmonious effect, particularly when softened by the murmur of the waters."

To Cassell the voice of the swan "is low, soft and musical, and when heard from multitudes congregated together has a very pleasing effect." Shakespeare repeatedly alludes to the music of the swan with manifest confidence in its melody; Pallas, the ornithologist, likens their notes to silver bells; and Olafsson says that in the long Polar night it is delightful to hear a flock passing overhead, the mixture of sounds resembling trumpets and violins.

So now, though we no longer know that the soul of the poet returns to float, the embodiment of rhythmic grace, before our mortal eyes as in the years so long gone by, there yet remains to us the splendid imagery of that stately form in spotless plumage against the setting of the darkening sea, the wonder of that solemn requiem, and the prophecy and the mystery of the shadowy orchestra passing onward in the depths of the midnight sky.

Juliette A. Owen.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



PEPPER.

(*Piper nigrum* L.)

The pepperer formed an important member of the community in England during the Middle Ages, when a large proportion of food consumed was salted meat, and pepper was in high request as a seasoner.—S. Dowell, *Taxes in England*, IV. 35.

The plants yielding the black and white pepper of the market are climbing or trailing shrubs. The stem attains a length of from 15 to 25 feet. The climbing portions cling to the support (usually large trees) by means of aerial roots similar to the ivy. The leaves are entire, simple, alternate, without stipules. The flowers are very insignificant in appearance, sessile upon a long, slender, pendulous spadix. They are mostly unisexual, either monoecious or dioecious, that is the staminate (male) flowers and pistillate (female) flowers are separate, either upon different branches of the same plant (monoecious) or upon different plants (dioecious). The fruit is berry-like, with a thin, fleshy pericarp enclosing a single seed. The young fruit is grass-green, then changes to red and finally to yellowish when ripe. In southern India the flowers mature in May and June and the seeds ripen five or six months later.

Piper nigrum is a native of southern India, growing abundantly along the Malabar coast. It thrives best in rich soil in the shade of trees to which it clings. It also grows in Ceylon, Singapore, Penang, Borneo, Luzon, Java, Sumatra and the Philippines. It is cultivated in all of the countries named, especially in southwestern India. Attempts at its cultivation have been made in the West Indies.

In India the natives simplify the cultivation of pepper by tying the wild-growing vines to a height of six feet to neighboring trees and clearing away the underwood, leaving just enough trees to provide shade. The roots are covered with heaps of leaves and the shoots are trimmed or clipped twice a year. In localities where the pepper does not grow wild, well drained but not very dry soil not liable to inundations is selected. Dur-

ing the rainy season or during the dry season in February cuttings are planted about a foot from the trees which are to serve as support. The plants are manured and frequently watered during the dry season. They begin to yield about the fourth or fifth year and continue to yield for eight or nine years. The methods of cultivation differ somewhat in different countries. The harvest begins as soon as one or two berries of the base of the spike begin to turn red, which is before the fruit is mature. Two crops are collected each year, the principal one in December and January, the second in July and August. The spikes are collected in bags or baskets and dried in the sun on mats or on the ground. Ripe berries lose in pungency and also fall off and are lost.

Pepper is of extreme antiquity. It received mention in the epic poems of the ancient Hindoos. Theophrastus differentiated between round and long pepper, the latter undoubtedly *P. longum*. Dioscorides and Plinius mention long, white and black pepper and dwell upon the medicinal virtues of spices. Tribute has been levied in pepper. In 408, Alaric the daring ruler of the barbaric Visigoths, compelled the conquered and greatly humiliated Romans to pay as part of the ransom 3,000 pounds of pepper. During the Dark and Middle Ages pepper was a very costly article, as is evidenced by the fact that it was frequently found among royal presents. The pepper-corn rents, which prevailed during the Middle Ages, consisted in supplying a certain quantity of pepper at stated times, usually one pound each month. The high price of pepper was the prime motive to induce the Portuguese to seek a sea-route to India, the land of pepper. The route via the Cape of Good Hope led to a considerable re-

duction in price. About this time, also, began the extensive cultivation of pepper in the Malay peninsula.

The black pepper is the unripe, dried fruit of the pepper plant. The white pepper consists of the ripened fruits from which the pulpy pericarp has been removed. It is not nearly as pungent as the black pepper, but it has a more delicate aroma. Occasionally the dried black pepper is "decorticated" by blowing, thus giving the "corns" a smooth appearance resembling the white pepper. This is a very absurd proceeding, as by this process the most spicy portions are removed. The quality of the pepper is almost proportionate to the weight of the corns; the lighter the poorer the quality. After the fruits are dried they should be carefully winnowed to remove light grains and all refuse. Very frequently these winnowings are ground and placed on the market. Adulteration of pepper is quite common, especially when ground. A wise plan is never to purchase ground spices. Buy them whole and grind them at home or have them ground before your eyes. Good whole peppers should sink in water and should not crumble between the fingers.

There are several commercial varieties of pepper, as Malabar, Penang, Batavia, etc., differing considerable in quality.

The pungent taste of pepper is due to a resin and the odor is due to an ethereal oil. Besides these there is present an alkaloid known as piperin.

The chief use of pepper is that of a spice, added principally to meats, but also to other food substances. Its use is, however, less now than it was during the latter part of the Middle Ages. So extensive was the dealing in pepper that the English grocers of the time were known as pepperers. It was very liberally used with all meats, especially chopped or sausage meats. It was used as snuff or added to snuff tobacco to increase its effectiveness. It is still highly prized as an aid to digestion. Applied externally it is used as a counterirritant in skin diseases. Italian physicians recommend it highly in malarial diseases.

Description of Plate—A, flowering twig; 1, portion of spike; 2, ovary with stamens; 3, stamens; 4, young fruit; 5, 6, portions of spike (colors are wrong, 5 should be red and 6 should be green); 7, 8, fruit.

Albert Schneider.

MARCH.

March, thou bully grim and gruff,
Ever grumbling, hoarse, and rough!
Always howling at the door
Of the rich man or the poor;
Screaming words that do not reach—
Words unlike our human speech.
Down the hollow chimney-bore,
Hark the raging tyrant's roar!
Beat not with thy sleety flail,
Or the keen lash of thy hail,
Infant Spring, that tender child,
Frightened when thou even smiled.

Cruel March, Sir!

—Walter Thornbury.

BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IX.

APRIL, 1901.

No. 4

APRIL.

No days such honored days as these! While yet
Fair Aphrodite reigned, men seeking wide
For some fair thing which should forever bide
On earth, her beauteous memory to set
In fitting frame that no age could forget,
Her name in lovely April's name did hide,
And leave it there, eternally allied
To all the fairest flowers Spring did beget.
And when fair Aphrodite passed from earth,
Her shrines forgotten and her feasts of mirth,
A holier symbol still in seal and sign,
Sweet April took, of kingdom most divine,
When Christ ascended, in the time of birth
Of spring anemones, in Palestine.

—Helen Hunt Jackson.

I come, like a hope to a gloomy breast,
With comforting smiles, and tears
Of sympathy for the earth's unrest;
And news that the summer nears,
For the feet of the young year every day
Patter and patter and patter away.

I thrill the world with a strange delight;
The birds sing out with a will,
And the herb-lorn lea is swift bedight
With cowslip and daffodil;
While the rain for an hour or two every day
Patters and patters and patters away.

—Bernard Malcolm Ramsay, in the Pall Mall Magazine.

THE CURASSOW.

An interesting race of birds, known as the Curassows, has its range throughout that part of South America, east of the Andes Mountain range and north of Paraguay. All the species are confined to this region except one, which is found in Central America and Mexico. This is the bird of our illustration (*Crax globicera*).

The Curassows belong to the order of Gallinaceous birds and bear the same relation to South America that the pheasants and grouse bear to the Old World. They are in every respect the most important and the most perfect game birds of the district which they inhabit. In all there are twelve species placed under four genera. As the hind toes of the feet are placed on a level with the others they resemble the pigeon and are unlike many of the other gallinaceous birds.

The Curassows are very large and rather heavy birds and some of them are larger than our turkey. They have short wings and a strong bill. At the base of the upper mandible and on the upper side there is a large tubercle-like excrescence which is of a yellow color and quite hard. Upon the head, there is a gracefully arched crest of feathers which is made of curled feathers, the tips of which are white in some of the species. This crest can be lowered or raised at the will of the bird. The plumage of the species illustrated is a beautiful and velvety black, except the white on the lower portion of the body. It is said that their motions are much more graceful than are those of our common domestic turkey. "They live in small flocks, and are arboreal in their habits, only occasionally descending to

the ground, while roosting and building their nests on the branches of trees." The nests are large and made of twigs and willowy branches held in place by the stems of grasses, which are neatly interwoven between them. The nest is lined with down, feathers and leaves.

It is said that they are easily domesticated and that in some parts of South America they may be found in tame flocks around the homes of the planters. One authority states that at about the beginning of the present century a large number of Curassows were taken from Dutch Guiana to Holland, where they became thoroughly domesticated, breeding as readily as any other kind of domestic poultry. Though a tropical bird, it would seem that they might be acclimatized. They would certainly form a valuable addition to the list of our farm fowls, for their flesh is said to be "exceedingly white and delicate."

The female is not as large as the male and is usually reddish in color. Their food consists almost entirely of fruit and insects.

About the middle of the eighteenth century Eleazar Albin wrote "A Natural History of Birds," in which he gives a very interesting account of the Curassow and an excellent illustration of the bird. He says: "I took a pourtray of this bird at Chelmsford in Essex; it was very tame and sociable, eating and drinking with any company. The Cock I had of a man from the West Indies. They are generally brought from Carasow, from whence they take their Name. They are called by the Indians Tecuecholi, Mountain-Bird or American Pheasant."



LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

SOME NOTABLE NESTS.

The Clymer boys and girls, of Cloverdale, New England, belonged to a Bird Club; they were proposed to membership by their neighbors, the Walkers; in fact, the two families composed the club, and it partook of the nature of a secret society.

All this was before the young people of Cloverdale knew of Clark University, and Dr. Hodges' "Ten to One Clubs," wherein the members pledged themselves to strive by all imaginable means—provided they were also practical—to induce ten song birds to live and sing each year, where only one was found the year before.

It was not necessary for the Cloverdale Club to put up carefully constructed and artistic bird houses, or to hang cotton and the like fine nest-building materials in choicest ornamental shade trees—not at all. The English Sparrow had not found the village in those days; the song birds were there, they knew all the good locations and just where to find the best stuffs for constructing, furnishing and decorating their homes; the work of the club was to find these homes, to study them, with the ways and habits of their occupants, and to record their discoveries in a big book labeled, "Things Not Generally Known."

Many of the statements in this book were as broad and conclusive as scientific dogmas, but the Cloverdale Club did not waste its time searching for hundreds of instances to establish a single truth; one was enough to be worthy of record; then, if some time the big book should be given to the public, and some naturalist or investigator should choose to confirm its statements by patient research, of course he would be welcome so to do. The club had the distinction of discovery, that was enough.

One interesting item recorded was this: "Birds—such as Orioles—who build in conspicuous places, like to decorate the outside of their nests, and in so

doing are known to use manufactured materials and patterns." Strange statement, but of course thereby hangs a tale, and here it is.

At the spring house-cleaning time, Mrs. Clymer had the big, bright sitting-room carpet taken out under one of the old colonial elms, at the east of the house, to be cleaned. Mrs. Baltimore Oriole was up in the elm that morning looking for a building spot that should be a bit superior to the old one; she had spent three summers in that tree, was familiar with the ways of the club, and habits of the family; like the birds of Eugene Field's boyhood, "she knew her business when she built the old fire-hang-bird's nest."

No one was near when Mrs. Oriole fixed her eyes on the great red, green and white ingrain carpet, and admired it; what she thought we know not, but when she glanced at the hitching post under the tree, she instantly descended from high, waving branch, to lowly square post, for exactly covering the top of the same was a miniature carpet, a piece just six by six inches which Patrick should have left indoors; not having done so, he laid it on the inviting post for safe-keeping. That bit of wool fabric was very valuable, it exactly filled a jog right by the fireplace, in which, alas! ever after was seen an ugly piece of oil cloth!

All summer long the club girls and boys gazed with wonder at the gay nest in the elm, hanging like a solitary blossom among the leaves; their speculations about it would fill a long chapter; but after the birds were flown far to the south, and the leaves were gone, that nest was finally cut down and told its story: thread by thread, just as pulled from the bit of carpet, had been woven into a decoration for the outer wall of that hanging house, till a rude reproduction of the original tiny rug was under the feet of the birdlings, and over the heads of the boys.

The club held a special exhibition of

that nest, and at Thanksgiving time one of the home-coming guests, who was an enthusiastic kindergartner in the city, persuaded those generous nature students to let her take their treasure to the poor children who seldom saw the commonest kind of a hang-bird's nest, and in that kindergarten it may be seen to-day.

Another entry in the club book was this: "Birds building on the ground, especially Vesper Sparrows, locate if possible where they have a fine outlook, and give great attention to the arrangement of the front yard."

This was discovered when Emily Clymer took her small brother Jo up in the "side hill pasture" to see the finest mountain view in all the county, and to find wild strawberries; while picking the berries they found what was afterward called the juniper house; this was a Vesper Sparrow's home, roofed by green growing juniper.

Everybody knows that the prophet Elijah could never have sat and wept under a New England juniper tree; no tree is less high or more nearly horizontal than this; in fact, we call it a bush—where it is big—this one was not larger than Emily Clymer's two hands, and growing straight out from descending ground, it formed a flat, green roof to the Sparrow homestead; then, while my lady sat upon her nest, she looked out of her tiny front door, across a gently sloping lawn, upon a whole range of mountains. But most remarkable of all were the ornamental shade trees, for just ten inches from the door, on either side, waved two big brakes, symmetrical in size and shape; they gracefully arched across the entrance, and were to the Sparrow domicile as the giant elms to the big Clymer homestead. A sketch of this beautiful residence was made by a member of the club—for cameras were not common in Cloverdale then—the picture cannot be taken from the club book, but I think we can see it all with our mind's eye.

Here is one of the most astounding statements in that book of many observations: "Some Phoebe's are like the Golden Eagle in three ways—first, they build on rocky and inaccessible cliffs, second, they build in the same place for

one hundred years; and, third, when the young are big enough to fly, they know how, and just go up without any practicing." All this can be proved to any one who will go in nesting time to a cliff overhanging the river just below Cloverdale, and who will accept the testimony of some of the most reliable and respectable men who have honored that place in the past century.

You must go in a boat and hug the shore; of course you need a member of the club for guide; at an unexpected moment you are told to look over your head, and there, glued to a shelf of rock so small as to be entirely covered by the same, is the nest! No porch, or even doorstep, beyond its wall—an overhanging roof of rock above, a shoreless expanse of water below; now, if some one can keep the boat steady, and you have the nerve to stand at the highest point of the bow, then by reaching over your head you can gently touch some fuzzy bits of life in the nest. Now you know the first and last of the facts recorded are correct: there is the nest on the inaccessible cliff; there are the birds, and if they did not fly up and out into the world the first time they stood on the edge of the nest, would they not be in the dark water below, instead of coming back to the old home for a hundred years?

The evidence of successive occupation for a century is this: The present family of Walkers—father and children—have watched that nest, never finding it empty a summer for twenty years. Old Deacon Walker, grandfather of our club members—who, of course, initiated their father—proved that Phoebe's had hatched in the cliff nest during eighty years previous, in this wise: After he had stood guard forty years, as the deacon loved to relate, didn't his Uncle Israel—who had been spending just those two-score years in the South—come home one spring evening, and the very next morning that ancient worthy demanded a boat and a boy to take him under the old Phoebe's nest on the ledge, which he affirmed had never been without tenants during the forty years before he left Cloverdale?

So there are the figures and facts showing how not only the nest, but bird love and bird lore had come down through the

century, and with such an inheritance, no wonder the Walkers are on the best of terms with feathered folk, or that they, with their confidential friends, the Cly-

mers, are still adding to their bird book things not generally known.

Elizabeth Reed Brownell.

THE BLACKBIRD'S SONG.

The bee is asleep in the heart of the rose,
The lark's nestled soft in the cloud,
The swallow lies snug close under the eaves—
But the blackbird's fluting is loud;
He pipes as no hermit would or should,
Half a mile deep in the heart of the wood,
In the green dark heart of the wood.

The raven's asleep in the thick of the oak,
His head close under his wing;
The lark's come down to his home on the earth—
But the blackbird still will sing,
Making the heart of the dark wood thrill
With the notes that come from his golden bill,
That flow from his golden bill.

—Walter Thornbury.

A GOLDEN EAGLE.

In January, 1900, I had given me a Golden Eagle. He had been picked up in a stunned condition in the foot-hills, having received a shock from the electric wires, on which he had probably alighted for a moment or struck in his flight. There is an electric power-house in the Sierras opposite Fresno, from which pole lines carry the strong current down to be used for power and light in the valley, and this was by no means the first record of eagles and other large birds being stunned or killed by them.

The person who found him had brought him down with the idea of having him stuffed, but as he showed a good deal of life, I begged to keep him alive, and he was handed over to me. He was evidently a young bird of the previous season, though nearly full grown. From tip to tip of his wings he was over five feet, and his wonderful black talons measured one and one-half to two inches beyond the feathers. His legs were handsomely feathered down to the claws, and his proud head, with its strong beak, large, piercing eyes, and red and yellow-brown feathers, was a thing of beauty. The rest of his body was dark, almost black, with the exception of three or four white diamonds showing on the upper tail feathers.

I kept him in a big box open on one side. When I first brought him home and had put him into the box, a neighbor's poodle came sniffing around for the meat I had brought for the eagle. He was on the back side of the box, and so could not see that there was anything in it, nor did he hear anything, but all at once the scent of the bird must have struck his nostrils, for with a squall of fear he disappeared from the yard and never afterward would venture near the cage.

During the time I kept the eagle, some two months, he never showed any desire to attack me, though his claws would have gone through my hand like a knife, nor did he display any fear of me. He never made any attempt to get out while anyone was in sight of him, nor did

I catch him in any such attempt, but sometimes at night I would hear him, and every morning his wings, beak and feathers showed he never gave up the hope of getting free.

I never fed him to the full extent of his capacity, but gave him from a pound to a pound and a half of meat daily at noon, which he devoured in a very short time, sticking his claws through the toughest beef and tearing it like ribbons with his beak. It was wonderful to see how clean he could pick a bone with his clumsy-looking great beak. I never knew him to touch any kind of food but raw meat. When anything was handed in to him, no matter how high up, he never accepted it in his bill, but struck at it with a lightning-like movement of his claws, scarcely ever missing it.

One day he snapped in two one of the bars across his cage, pried off another **and got out**. I was telephoned that my eagle was out, and hurried home to find all the children in the neighborhood blockaded indoors. The eagle was perched on the grape-arbor easily surveying the lay of things. A cat had crawled into the wood-pile and under the door-steps the venerable cock of the yard was congratulating himself on his safety, but feeling rather undignified. I procured a rope and took my first lessons in lassoing. The eagle had been so closely confined that he had not been able to gain the full use of his wings, and so could only run or flutter a few feet from the ground. I finally recaptured him and brought him back. He showed no fear and offered little resistance.

About the middle of March the weather became very hot, and it was really cruel to keep the bird penned up in such close quarters in such weather, so I took him out to the plains and set him free. He could not use his wings much, and it is very doubtful if he escaped the shotgun or rifle of some predatory small boy, but it was the best I could do for him. He was a beautiful specimen of a bird, and I only wish I could have kept him.

Charles Elmer Jenney.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



HARLEQUIN DUCK.
(*Histronicus histrionicus*.
 $\frac{1}{2}$ Life-size.

COPYRIGHT 1951, BY
A. W. MUMFORD, CHICAGO.

THE HARLEQUIN DUCK.

(*Histrionicus histrionicus*)

The Harlequin Duck is the sole representative of the genus to which it belongs. The generic and the specific names (*Histrionicus*), which unfortunately the strict rules of scientific naming require in the case of this bird to be the same, are from the Latin word meaning harlequin. This word, meaning a buffoon, is especially appropriate, for the arrangement of the colors on its head, neck and back give the bird a peculiar appearance, especially during the mating season. At this time, too, the drollery of their actions is very noticeable.

Harlequin is not the only name by which this bird is known. In the New England States and northward along the Atlantic coast it is frequently called the "Lord and Lady," because of the white crescents and spots of its plumage and the proud bearing of the male. It is also called the Rock Duck, the Mountain Duck and the Squealer.

Its range covers the northern portion of North America, Europe and Asia. "It is not common wherever found. In many parts of the Old World it is only a rare or occasional visitor; this is the case in Great Britain, France and Germany." In the United States, during the winter, it passes southward into Illinois, Missouri and California. It breeds only in the northern part of its range.

It is a mountain duck and "frequents swiftly running streams, where it delights to sport among the eddies below water falls or in the brawling rapids." It is not only an adept in the art of swimming and diving, but it also flies swiftly and to a great height. During the winter it frequents northern sea coasts and

exhibits the characteristics of other sea ducks, and is occasionally found far out at sea. It is known that the Harlequin will lead a solitary life, and it is sometimes observed in pairs or even alone on streams of remote and unfrequented localities.

The sexes vary greatly. While the male, which is the sex of the bird of our illustration, is brightly colored, the female is much more somber. The young resemble the adult female.

The food of the Harlequin consists almost entirely of the parts of aquatic plants and the smaller crustaceans and mollusks. The food is obtained by diving, frequently through several feet of water. Mr. Chapman tells us that the sea ducks in diving to obtain food, will "sometimes descend one hundred and fifty feet or more."

Its nest, though usually placed on the ground, is sometimes built in the hollow of a tree or a hollow stump, though always near a body of water. The nest is usually a simple structure made of the stems of water plants, twigs and grass thickly lined with the downy feathers from the breast of the duck. The eggs are occasionally laid on the grass, and no effort is made to build a nest. The female thoroughly covers the eggs when she leaves the nest.

The number of eggs varies from six to eight, though ten have been recorded. They are of a "yellowish buff or greenish yellow" color.

This duck is considered an excellent food and is much sought for by the natives of those regions which it frequents.

AN ORCHARD BIRD-WAY.

"A rodless Walton of the brooks,
A bloodless sportsman I;
I hunt for the thoughts that throng the woods,
The dreams that haunt the sky."

—*Samuel Walter Foss.*

An isolated orchard certainly comes very near being an inner sanctuary of bird life. For some reason or other, the gnarled old trees and matted June grass touch either the practical or artistic sense of bird nature very closely, and appeal strongly to many a bird heart, for therein do congregate all sorts and conditions of feathered life. Probably it is an exceptional feeding-ground, for the curled and misshapen leaves testify to the abundance of the hairy caterpillar and leaf-worm supply, which proves such delectable tidbit to the bird palate. When I see the birds feasting upon these unsavory looking morsels, I can but wonder at the unregenerate farmer who so loudly decries the bird as a fruit-destroyer, when a few hours' observation will teach him that to one cherry stolen there are a hundred tree destroyers gobbled up, and a thousand weed seeds devoured. It is Wilson Flagg who so curtly says:

"The fact, not yet understood in America, that the birds which are the most mischievous as consumers of fruit are the most useful as destroyers of insects, is well known by all the farmers of Europe; and while we destroy the birds to save the fruit, and sometimes cut down the fruit trees to starve the birds, the Europeans more wisely plant them for their sustenance and accommodation."

Our orchard is surrounded by a fence of weather-stained chestnut rails, whose punctured surface has been the scene of many a worm tragedy resulting in the survival of the fittest. We enter through a pair of lichen-covered bars, grey-tinted and sobered by age. How far less picturesque is our field and hedgerow when inclosed by that inhuman human invention, a barbed-wire fence, and trim swing gate. To be neat and up to date, is never to be picturesque, and seldom to be artistic. But our quiet entrance into the orchard has caused something of a disturbance

among the inhabitants, if no great alarm. Fluttering hastily to a convenient tree top goes a dainty red-eyed vireo, who seems to me to have more of a grey than olive gleam to his shining back. As he alights upon the topmost bough—

"A bird's bright gleam on me he bent,
A bird's glance, fearless, yet discreet,"

but to show that he is in no way seriously alarmed he flings down to us some sweet notes of liquid song. It is Wilson Flagg, I believe, that has dubbed him the Preacher, but to me he seems more correctly termed the Lover, for I can but interpret his accentuated notes into "Sweet Spirit, Sweet—Sweet—Spirit," a continuous cry, as it were, of loving eulogy to the devoted little wife who is so carefully hidden in her pocket nest in a distant thorn tree. But all of this time we understand his clever machinations, as he carefully leads us in an opposite direction by his song allurements. He flits from tree to tree with a naive turn and flutter, keeping upon us all the time, an eye alert and keen, until he deems us at a safe distance enough to be left to our own clumsy device, when, with a quick turn, he wheels backward to the starting-point, and we hear a triumphant praise call to the beloved "Sweet Spirit." Near a corner of the old orchard where there are great bunches of Elder and Sumach, we hear vehemently stitching, a busy little Maryland yellow throat, doing up his summer song work with an energetic "Stitch-a-wiggle, Stitch-a-wiggle, Stitch-a-wiggle, stitch 'em," the "stitch 'em" brought out with such emphatic force that it seems the last satisfactory utterance of a work accomplished. His pert vivacity has been most delightfully illustrated by Ernest Seton-Thompson, in Frank Chapman's "Bird Life," and I am sure the snap-shot caught him on his last accentuated "stitch 'em." Dr. Abbot tells us that these busy

little people usually build their nests in the skunk cabbage plants, indicating that they must have an abnormal odor sense, but perhaps they allow their sense of safety to overcome their sense of smell. However, this pair of yellow-throats have built instead, among some thickly matted Elders, just above the ground.

Another fact that favors our orchard in bird minds, is its close proximity to a thickly foliated ravine which affords such delightful security to feathered people. It is also a charming background for our sunny orchard, filled in below, as it is, with tall, ghostly stalks of black cohosh gleaming white in the shadows.

Near by, upon a bit of high ground, quivers a group of prim American aspens, the pale green of their bark gleaming against the dark shadows of a hemlock hedge. As we look at them, not a leaf is in motion, when all of a sudden one little leaf begins to gesticulate frantically, throwing itself about with violent wildness, then another leaf catches the enthusiasm of the soft summer air, then another, and another until all of the trees are a mass of gesticulating, seething little serrated atoms, for all the world like a congregation of human beings, vociferating, demonstrating, or contradicting some poor little human leaf that has dared to be moved by some passing thought in advance of his fellow kind. Darting through the quivering foliage comes a gleam of fire, which resolves itself into a scarlet tanager who calls to us, "look-see," demanding our attention to his bright beauty, remembering possibly that his brilliant coloring is but a thing of short duration, for too soon will come winter and plain clothes. Perched upon a fence rail, but somewhat out of place in this shady corner, sits a blatant meadow lark, about whose golden breast is hung a gleaming neck chain and locket of shining black feathers, of which, from the pert poise of his head, we deem him justly proud, and he is at least a conspicuous spot of color against the green of the hillside. He eyes us impertinently as he inconsistently but musically calls to us, "You-can't-see-me, You-can't-see-me," in the face of the most contradictory evidence of his own conspicuousness,

varying his song to "Erie-lake-Erie," with every other breath. As a child I used to wonder who taught him the name of the great lake on whose borders he makes his summer home. But to other people, other interpretations, for to Neltje Blanchan he says "Spring-o'-the-year, spring-o'-the-year," and to Frank Chapman his song is a bar of high, thrilling notes. Sing on, you wary warbler, for we have not time to search out your carefully hidden nest among the timothy grasses of the distant meadow, for we know that it would be like looking for the pearl in the oyster, so carefully is it concealed among the dried grasses, but which snakes and field mice depredate so effectually. In the distant valley we hear the soft echo of the Italian liquids of the wood thrush's "A-o-le-le, a-oa-o-le." Shy little songster, who so sweetly trills to us long after his feathered kind have tucked their busy little bills away in soft wings. Across the orchard comes the romantic "Coo-coo-coo-coo," sometimes interpreted into "I-thou-thou-thou," of the purple plumaged mourning dove, starting out on a high minor and softly falling to a low contralto. There are no more delightful representatives of romantic bird love, than these birds illustrate. More frequently than in any other species you see the devoted pair going about together, on the telegraph wire, on the tree top, on the wing, always together, undulating their graceful necks with marked devotion. Many a bird lover has criticised Mr. Dove for his remarkable fondness for a lady who is a so decidedly slack housekeeper, and who is satisfied with so shiftless a nest in which to deposit the two white eggs, for the few carelessly thrown together sticks can prove anything but a bed of down to the tender bird babies. However, perhaps these romantic birds consider that "love is enough" as they follow Le Gallienne's refrain of:

"The bird of life is singing on the bough,
His two eternal notes of 'I and Thou'—
Oh, hearken well, for soon the song sings
through
And would we hear it, we must hear it
now."

Alberta A. Field.

THE CANADA GROUSE.

(*Dendragapus canadensis*)

The Canada Grouse, also called the Spruce Partridge, frequents the ever-green forests and swamps and the shrubby areas of British America east of the Rocky Mountains, and in Alaska it is a resident of the Pacific coast. In its southern flights it seldom passes beyond the latitude of the northern portion of New England and Minnesota.

This bird is an interesting member of the bird family Tetraonidae, which also includes the birds variously called bob-white, quail and partridge, the ptarmigans and the prairie hen. The family includes about two hundred species, about one-half of which belong to the Old World. There are twenty-five distinct species of the subfamily of grouse. These are practically confined to the higher latitudes of the northern hemisphere and are strictly speaking non-migratory. In fact, nearly all the birds of this family are resident throughout the year in the localities where they are found.

They are terrestrial in their habits, and when frightened they usually depend on hiding in places where their dull colors will least attract attention, but they will, occasionally, fly into trees when flushed.

The Canada Grouse, like all the related species, is a bird of rapid flight. The feathers of their small wings are stiff, causing a whirring sound during flight. The male during the mating season gives a great deal of attention to his appearance. He is quite black in general color and more or less barred with white underneath and above with gray or reddish brown. The female is not quite as large as the male, and is not as dark in color. Above the eye of the male there is a small area of bare skin, which is a bright vermillion color.

These gentle and retiring birds mate in the early spring and remain together through the breeding season. Captain

Bendire states that he has good reason for believing that the mating may last for more than one season, as he has frequently found a pair, in the depth of winter, when no other individuals of the same species were near. The nest, consisting of loosely arranged blades of grass and a few stalks and twigs, is built by the hen on a slight elevation of ground, usually under the low branches of a spruce tree.

The number of eggs varies greatly. Mr. Ridgway says that they vary in number from nine to sixteen. The eggs also vary greatly in color from a pale, creamy buff through various shades to brownish buff, and are irregularly spotted with a deeper brown, though occasionally they are spotless.

During the spring and summer months the food of the Canada Grouse consists very largely of the berries of plants belonging to the Heath family, such as the blueberry, the huckleberry and the bearberry, as well as the tender buds of the spruce. In the winter it feeds almost entirely on these buds, and the needle-like leaves of the spruce, the fir or the tamarack trees. At times they seem to show a preference for certain trees, and will nearly strip the foliage from them.

As a food for man their flesh is far from satisfactory. It is dark-colored and strongly flavored with the odor of their natural food. However, certain Indian tribes are said to relish them and hunt them extensively.

Mr. Bishop, in "Forest and Stream," relates the following very interesting account of the strutting of the male Canada Grouse while in captivity. He says, "I will describe as nearly as I can his conduct and attitude while strutting: The tail stands almost erect, the wings are slightly raised from the body and a little drooped, the head is still well up, and the feathers of breast and throat are raised



FROM COL. CHY. ACAD. SCIENCES.

403

CANADA GROUSE.
(*Dendragapus canadensis*.)
 $\frac{1}{2}$ Life-size.

PLATE 100

COPYRIGHT 1901, BY
A. W. MUNFORD, CHICAGO.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

and standing out in regular rows, which press the feathers of the nape and hind neck well back, forming a smooth kind of cape on the back of the neck. This smooth cape contrasts beautifully with the ruffled black and white feathers of the throat and fore breast. The red comb over each eye is enlarged until the two nearly meet over the top of the head. This comb the bird is able to enlarge or reduce at will, and while he is strutting the expanded tail is moved from side to side. The two center feathers do not move, but each side expands and contracts alternately with each step the bird walks. The movement of the tail produces a peculiar rustling, like that of silk. This attitude gives him a very dignified and even conceited air. He tries to attract attention in every possible way, by flying from the ground up on a perch, and back to the ground, making all the noise he can in so doing. Then he will thump some hard substance with his bill. I have had him fly up on my shoulder and thump my collar. At this season he is very bold, and will scarcely keep enough out of the way to avoid being stepped on. He will sometimes sit with his breast almost touching the earth, his feathers erect as in strutting, and making peculiar nodding and circular motions of the head from side to side; he will remain in this position two or three minutes at a time. He is a most beautiful bird, and shows by his actions that he is perfectly aware of the fact."

There seems to be a diversity of opinion regarding the method followed by this grouse to produce the drumming sound. Mr. Everett Smith, as quoted by Captain Bendire, says, "The Canada

Grouse performs its drumming upon the trunk of a standing tree of rather small size, preferably one that is inclined from the perpendicular, and in the following manner: Commencing near the base of the tree selected, the bird flutters upward with somewhat slow progress, but rapidly beating wings, which produce the drumming sound. Having thus ascended fifteen or twenty feet it glides quietly on the wing to the ground and repeats the maneuver." According to this and other authorities a tree, usually spruce, having a diameter of about six inches and inclining at an angle of about fifteen degrees, is selected. Frequently these trees are used so extensively and for so long a time that the bark on the upper side will be much worn. Other authorities, and among them Indians, who live in the regions frequented by this grouse, claim that the drumming is produced while flying from the branches of a tree to the ground, repeating the operation several times in succession. Another authority describes the drumming of the male as follows, "After strutting back and forth for a few minutes, the male flew straight up, as high as the surrounding trees, about fourteen feet; here he remained stationary an instant, and while on suspended wing did the drumming with the wings, resembling distant thunder, meanwhile dropping down slowly to the spot from where he started, to repeat the same thing over and over again."

The Canada Grouse is easily domesticated and would make an interesting and amiable bird pet, because of their peculiar habits.

Seth Mindwell.

DO PLANTS HAVE INSTINCT.

Instinct has been defined as a spontaneous impulse, especially in the lower animals—that moves them, without reasoning, toward actions that are essential to their existence, preservation and development. Instinct, imbedded in their organic structure, is the guide of animal life as reason is the guide of rational life. Instinct is said to be incapable of development and progress.

It is instinct that guides the wild goose in his long flight to meet the changing requirements of food and nesting. It is instinct that enables the carrier pigeon, though taken hoodwinked and by night to distant points, to wing his way unerringly homeward. Instinct leads the thrifty squirrel to stock his larder with nuts in anticipation of the period that must pass ere nuts are ripe again, and teaches him to destroy the embryo plant by biting out the germ so that his chest-nuts will not sprout and thus be spoiled for food. The same wonderful power enables the bee to build her comb upon the strictest mathematical principles so as to obtain the greatest storage capacity and strength of structure with smallest consumption of wax, and then to store it with one of the most perfect and concentrated of foods. These and many other well-known cases of animal instinct will occur to the reader, but the object of this article is to mention a few phenomena of plant life, whereby they make, what we should designate in human beings, an intelligent adjustment to environment or provision for their future life and development.

As autumn approaches, even before Jack Frost strikes the first rude signal for winter quarters for insect and plant, or the wintry blasts compel the trees to furl sail and scud under bare poles, the forest trees begin to prepare for unfavorable conditions by forming and securely tucking away the bud that is next year to develop into leaf and flower. Before the

leaf drops off, a substantial layer of cork is made to close up the pores through which the sap had so freely flowed during the growing season.

My older readers know, of course, that the green color of the leaf is due to the numerous corpuscles of chlorophyll which fill the cells. This same chlorophyll has an important mission to fulfill. These little green bodies are the only real food-making machines in nature. Upon the product of these tiny mills all animate nature depends for food. Their motive power is light, and their raw material the inorganic fluids absorbed by the roots from the soil, and their product is sugars and starches. It will be seen that chlorophyll is one of the most precious, as well as one of the rarest of substances, for while there may appear a great quantity it is superficial, never entering deeply into the substance of the plant.

The trees, by a sort of instinct, shall we say, withdraw their cohorts of green-liveried workers from the front as autumn approaches and deck themselves in the more gaudy but less wholesome colors of declining life. It is after the chlorophyll is withdrawn that the layer of cork is formed. The sturdy oak usually holds his brown leaves until they are whipped off by the wind.

The plants have been using light as a motive power for ages, while man, with his much-vaunted reason, is just beginning to utilize the kindred force, electricity, in arts and sciences. Man makes light draw a few pictures in sombre black and white, while nature flings broadcast landscape and life scenes in varied tints and shades.

In the process of photosynthesis much more energy is received than is necessary to run the machinery, so the plant, with commendable frugality, uses it in laying on what botanists call warming-up colors. If you will notice the peach twigs the next

time you take a walk, you will see that the more tender shoots and the buds are decked in rich reds and browns. That this is not for mere ornament may be practically demonstrated by wrapping the bulbs of two similar thermometers, the one with a green leaf, the other with a brown or red leaf, say of begonia or beet. Then put the two in the sunlight and you will soon find a difference of from six to ten degrees in favor of the warming-up color. Speaking of buds, have you examined the horse chestnut bud? It is prepared for the winter in the most substantial manner. The future leaf is first wrapped in a quantity of finest silky wool, then a number of tough light green cases are put on, and this is followed by compact brown scales neatly overlapping, with a complete coating of wax, so that the interior is effectively protected from the cold and moisture. The use of the warming-up colors is quite common with plants.

In the far north the same plant that requires the whole long growing season to mature its seed, will crowd the whole process into a few weeks. It will suspend growth and all other processes, or run them on short time and devote itself almost entirely to producing seed, and the seed itself will have much thicker shell.

I was interested last autumn in the pathetic struggle of a humble little *Chenopodium album* that had started life late and under unfavorable circumstances. It came up in September under the north piazza near the beaten foot path; close up to the building. I was first attracted by the fact that, though it was not over a foot high, it had bloomed and was making seed at a desperate rate, while its sisters earlier in the season reached several feet in height before blooming. But, alas! for the vanity of the poor little creature, the cold weather during the Christmas holidays came on, and the steam being shut off, the side of the building grew cold and my struggling little friend was frozen, and soon its lifeless remains were the sport and derision of the rude January winds. I pitied the poor little vagabond despite the bad record of her family. Indeed plants, like people, must suffer sometimes because of an evil ancestry. In this case I was touched by the pathos

of the situation, and really hoped the pertinacious little wretch might proudly scatter her well-matured seed upon the hard-beaten path as an inspiration to the many boys that passed daily, grumbling because of the hardness of their lot. But the only moral I can now draw is the foolishness of delaying in the right start.

Sometimes the supply of light-energy is so great that the little chlorophyll machines cannot use it in their legitimate work, nor does the plant use it in preparing the warming-up color. Then the disc-shaped corpuscles turn their edges instead of their flat surfaces to the light, or sometimes move deeper down into the leaf. In some cases the leaf itself turns edgewise instead of broadside to the sun.

There are many plants so constituted that they cannot live from year to year in our northern climate, and they must make some provision for preserving their species, and right cunningly do they do this. At a certain period of its growth the potato, for example, puts its starch-making machinery to work on full time, and hurries the starch down below the surface of the ground, and stores it up in what we call a tuber. These tubers have stored in them a number of embryo potato plants, whose lack-luster eyes we see peeping out on all sides. When the time for growth comes, the young plant starts with a reserve-food supply sufficient to keep it growing for some time. We have all noticed, no doubt, how large a plant will grow from a potato, even in a comparatively dark cellar. We must not think that tuber-bearing vines and nut-producing trees are actuated entirely by philanthropic motives. Each nut is the young tree sent forth with his patrimony strapped to his back, ready to make a good start in the world as soon as the favorable time comes.

There are many devices for spending the winter that limits of time and space will prevent me writing about. Many of them more curious than the simple examples I have cited.

Plants are themselves generally unable to move from their fixed positions, so if they are to become prominent in the world they must send out their children—and many and ingenious are their devices for accomplishing this end. Most of my

readers are familiar with the parachutes of the silk weed, dandelion and various members of the Compositae family. How they sail through the air. A walk through the autumn forests will make one the unconscious, perhaps unwilling, carrier of numerous Spanish needles, stick tights, burrs and seeds of various plants who have taught their children to steal rides in all sorts of provoking ways. I imagine the wicked old mother laughs as her ugly baby clings to your clothing, sure of a safe ride to a more favorable place for growing. Many plants achieve the same end in a more pleasant way. They produce fruits and berries so luscious that some bird or animal will carry it some distance for the sake of the pulp. Man himself, philanthropist as he is, when he finds that a plant has produced a luscious fruit or palatable seed, will help the distribution and growth, and bring his superior intelligence to the assistance of the plant's slow instinct to improve its product. A book might be written upon the methods of seed dissemination. In fact, there is a very interesting book upon the subject.

We will just notice briefly the marvelous adaptation of plants to their environment. In the dry plains of Arizona grows

a peculiar thick-leaved, stunted, cactus-like plant, suited to withstand the drouth. In the forests of Central South America a great vine climbs to the tops of the tallest trees and there flaunts its gay colors to the breeze. In Damara Land, southwest tropical Africa, upon a small upland section, and nowhere else in the world, grows the marvelous *Welwitschia mirabilis*, with no real leaves, but with its two cotyledons, persistent and growing to enormous length, living a century and acquiring a great trunk, the flower-stalk growing up from the bare trunk while the two great leaves, if I may so designate them, whip about in the breezes for a century without change, except as they fray out at the ends. These three so dissimilar plants all had a common, not so remote, ancestor, but have grown so unlike in their effort to adapt themselves to their environment, that no casual observer would suspect they were akin.

There is so much to say about the wonderful intelligence displayed by plants in their various activities, that a volume could not do the subject justice. We started with the question, Do plants have instinct? We end with the question, Have they? Rowland Watts.

Still winter holds the frozen ground and fast the streams with ice are bound,
There's many a dreary week to come before the flowers bloom;
Though everything were lost in snow yet Nature's heart beats warm below
And Spring will build her palace gay on hoary Winter's tomb.

—George Gee.

LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO



FROM COL. CH. ACAD. SCIENCES.

404

DOVEKIE.
(*Alle alle*.)
 $\frac{2}{3}$ Life-size.

COPYRIGHT 1901, BY
A. W. MUMFORD, CHICAGO.

THE DOVEKIE.

(*Alle alle.*)

This little bird, often called the Sea Dove, belongs to the family of auks (*Alcidæ*). The range of the Dovekie is quite limited. While the marble murrelet, a related bird, is confined to the northern Pacific coast of North America, this little bird frequents only the "coast and islands of the north Atlantic and eastern Arctic Oceans; in North America south in winter to New Jersey." It breeds only in the northern part of its range. It has been observed as far west as the state of Michigan, but its appearance there was, without doubt, accidental, for it prefers the wild sea coast, where the storm and waves bring to it an abundant supply of food.

It is said to be a rare visitor on the coasts of the British Islands and it has been reported as common as far to the northward as Spitzbergen. In Greenland, where it is commonly found a close companion of the black-billed auk, the native Greenlanders call the Dovekie the Ice Bird, as they consider it a harbinger of ice.

Though the wings of the Dovekie are small in proportion to the size of its body it flies well and rapidly. One writer states that it will move its wings almost as rapidly as will a hummingbird. It is an expert diver and while swimming or resting on the water it will frequently dip its bill into the water. On the land it is much more

graceful and walks better than nearly all the other members of the family of auks.

It feeds chiefly on small fish, crustacea and mollusks and will become very fat during a prolonged stormy season when the waves wash up an abundant supply of crabs and fish.

The Dovekie builds a simple nest usually in the crevices of rocky cliffs bordering the sea coast. It lays one or two bluish white eggs which are about the size of the pigeon's.

Mr. Saunders in speaking of the habits of the Dovekie says: "On the approach of a vessel this bird has a peculiar way of splashing along the surface of the water, as if unable to fly, and then diving through the crest of an advancing wave; it swims rather deep and very much by the stern."

The Dovekie is sometimes called a little auk to distinguish it from the larger species of the family. The flightless great auk, which at one time was common along the north Atlantic coast, belongs to this family. No living representative of the great auk has been reported since the year 1842. Unable to protect itself by flight it was ruthlessly exterminated by the zeal of hunters and fishermen who sought it for food, for its feathers and for the oil that could be extracted from its flesh.

As flying ever westward Night's shadows swiftly glide,
The sunrise at the dawning illumines the countryside.
The stars in quick succession in ether melt away,
Until the brightest planet is lost in glowing day.

—George Gee.

THE SONG SPARROW'S APPEAL.

Naturalists tell us that of all creatures below man, the largest animal brain in proportion to the size of the body is found in horses and song-birds. Whatever sense beyond instinct the little creature of whom we write may have had, something, at least, told it that it could obtain help at human hands.

A little sparrow the past season entered the kitchen of one of our country homes, and perched upon the window-sill in evident distress. Its feathers were ruffled, and its head ever and anon turned curiously around and up, as if looking at something out of the house and above the window.

In and out it continued to hop, without intermission, regardless of all offers of food, until the shutters were closed at twilight, and various were the surmises as to the cause of its strange conduct.

Through the course of the following day the same scene was enacted, without any clue appearing as to the cause of its distress.

At length, on the third morning, the mute petition for aid still continuing, one of the family, bethinking herself of the bird's curious upturning of the head, caught a new idea from it. Perhaps she might have a nest in the ivy that encircled the window, and something might be amiss with its little household.

Going to the second story and looking down, the cause of the trouble was at once manifest. A thick limb of the ivy had become loosened by the wind, and fallen directly across the petitioner's nest. It was too heavy for the bird to remove, and offered an insuperable difficulty in the way of her getting in to feed her young—now almost lifeless.

The branch was quickly removed, when the mother-bird, pausing only for a brief inspection of her brood, was on the wing in search of food. Her mate soon joined her, and both were busy as quick wings, worked by hearty good will, could make them.

Once only did the mother pause in her

work—as if desirous to give expression to her gratitude, she reappeared upon the window-seat, and poured forth a sweet and touching song, as of thankfulness to her benefactors.

She returned three successive seasons, to be noticed and fed at the same spot where her acquaintance and familiarity with man first commenced.

We will add another similar incident, which is also absolutely true.

The correctness is vouched for by Mr. George Babbitt, late captain on Gen. Gresham's staff, of which he himself was a witness.

During the fierce cannonading in one of the battles of the Civil War, a small bird came and perched upon the shoulder of an artilleryman—the man designated, we believe, as "No. 1," whose duty it is to force down the charge after the ammunition is put in the gun. The piece was a "Napoleon," which makes a very loud report, and the exact scene of this occurrence was at a place called "Nickajack." The bird perched itself upon this man's shoulder and could not be driven from its position by the violent motions of the gunner. When the piece was discharged, the poor little thing would run its beak and head up under the man's hair at the back of the neck, and when the report died away would resume its place upon his shoulder. Captain Babbitt took the bird in his hand, but when released it immediately resumed its place on the shoulder of the smoke-begrimed gunner. The singular and touching scene was witnessed by a large number of officers and men. It may be a subject of curious inquiry, what instinct led this bird to thus place itself. Possibly, frightened at the violent commotion caused by the battle, and not knowing how to escape or where to go, some instinct led it to throw itself upon the gunner as a protector. But, whatever the cause, the incident was a most beautiful and pleasing one to all who witnessed it.

George Bancroft Griffith.

THE WITCH IN THE CREAM.

A TRUE STORY.

The old stone farm-house in which my grandmother lived had beneath it what I thought a very interesting cellar. The floor was plastered and whitewashed like the walls, to ensure the place from rats and other intruders, as well as to keep it cool. From the walls, flat stones projected, serving as shelves on which the butter and milk were kept. For years the milk had had a shelf to itself near the window.

One summer morning, while Grandma and I were sitting on the porch waiting for breakfast, the little colored servant came to us with wide-open eyes, saying: "La, Missy, jes look at dis milk-pan!" We looked, and saw, to our disgust, that the inside of the pan was covered with sand and grime, while the milk, which usually was coated with rich, thick cream, was thin and poor. "Why, Janey," said Grandma, "you didn't put milk away in a pan like that, did you?" "La, no, Missy," said Janey, "nobody wouldn't nebber put milk away in a dirty pan." "This is very strange," said Grandma. "You will have to throw the milk away, Janey, and be especially careful to have the pan clean this evening." "Yes'm," said Janey, "I will."

The following morning, however, the milk had to be thrown away again, as the pan was in a worse condition than on the preceding morning. "I don't understand it," said Grandma. "It can't be rats, nor mice, for there is no way for them to come in." "They couldn't climb into a tin pan eight inches high, at any rate," I

said, "and if they jumped in they would drown." Janey shook her head knowingly and said, "It's witches, Missy, dat's jes what it is." A light board was placed over the milk that evening, but we found that the marauder pushed it off in the night. We felt that we must come to Janey's conclusion about the witches, if the mystery were not solved soon.

In the afternoon of the third day of these experiences we were sitting on the back porch with our sewing, both of us half asleep, when chancing to look up I saw a rat go scudding across the yard. Straight to the cellar window he went, and, approaching one corner, thrust his nose under the sash. He gave a mighty tug, pushed one paw under, and soon, by pushing and pulling with nose and with paws, he crept through the window. From my position on the porch I could see all that was happening in the cellar. He jumped to the milk shelf, turned around, raised himself on his forepaws, and clasped the edge of the milk pan with his hind ones.

He then threw his tail into the pan, whisked it rapidly over the milk, coating it with cream, and licked it. This he repeated until he had a full meal, or at least until he had skimmed all the cream.

He started homeward then, and I was so much amazed that I didn't attempt to stop him. On the following morning he was caught in the steel trap set just inside the window for him.

Elizabeth Roberts Burton.

THE BEAVER.

The genus of Beavers (*Castor*) is apparently represented by a single living species. By some authorities the American form is considered a distinct species and is given the technical name *Castor canadensis*, while the European form is called *Castor fiber*. In external characteristics the two resemble each other very closely, and it is in the study of the structure of the skeleton that the differences appear. However, though there is this diversity of opinion, it is sufficient for the reader to look upon the two forms as merely geographical races of the same species, and that the Beaver is a native of the greater part of the northern hemisphere. Though its home covered this extensive area, it has disappeared from the larger number of localities that it once frequented. Speaking of its range as a whole, it may now be considered rare except in certain isolated localities. This extermination is due to the advance of civilization upon its natural haunts, and the commercial zeal that has stimulated the hunter to greater efforts to effect its capture. Within recent years the Beaver was common in some of the Gulf States. In 1876 it was reported as abundant in Virginia. It is evident from an examination of the numerous writings regarding its distribution that the Beaver formerly existed in great numbers not only in the Atlantic States, but also to the westward as far as the Pacific coast.

The Beaver is a member of that large order of gnawing mammals called the Rodentia, from the Latin word meaning to gnaw. In this order are classed all those animals that have those peculiar long incisor teeth which are constantly renewed by growth from the roots and as constantly worn to a chisel edge, at the outer end, by gnawing. Such animals are squirrels, the gophers, the mice, the rats, the muskrats, the porcupines, the hares and the rabbits.

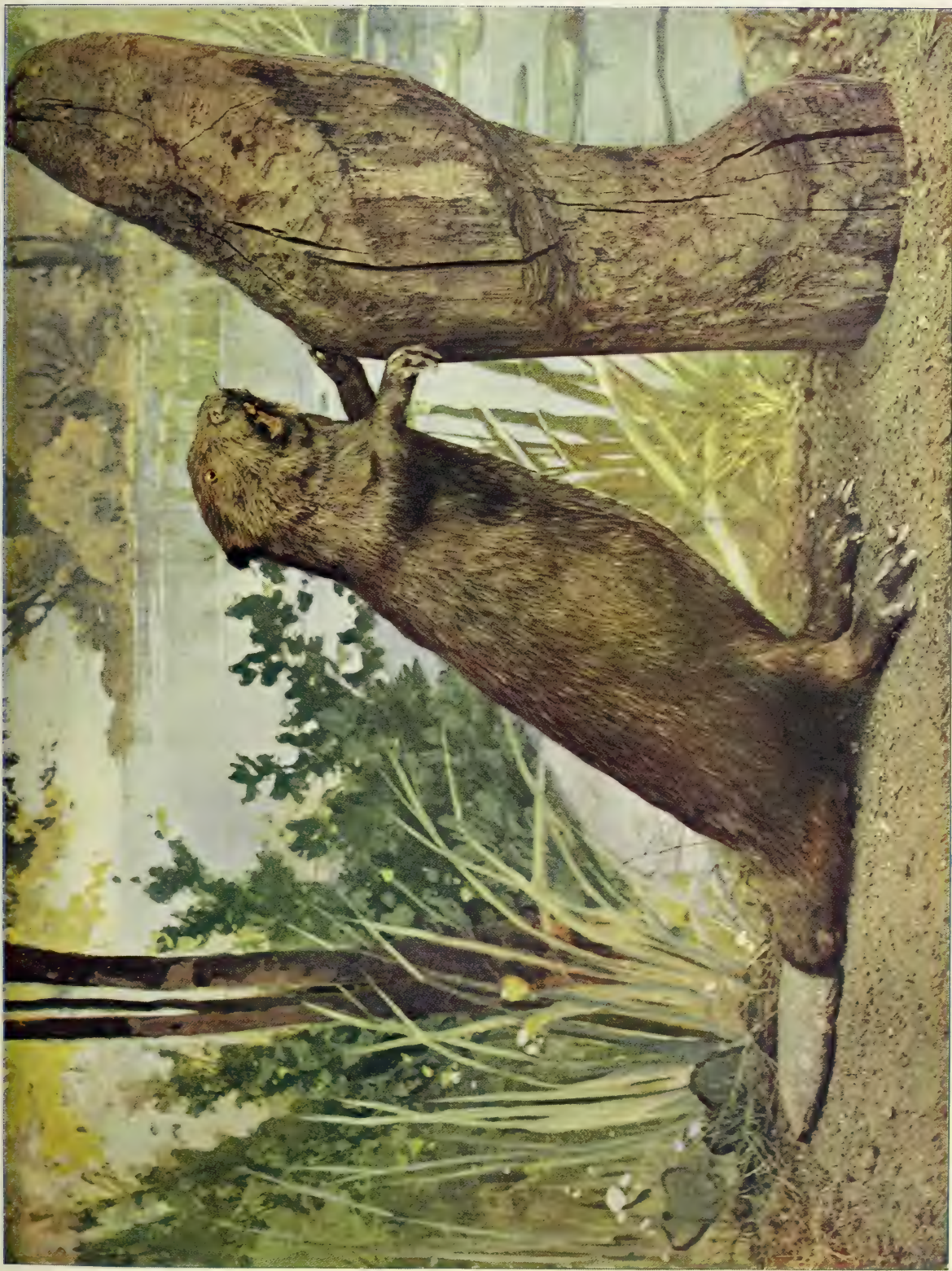
The habits of the Beaver are very interesting. Several years are required before its growth is fully attained, and it will increase in size after the teeth are fully mature. "Two-year-old Beavers generally weigh about thirty-five to forty pounds, while very old ones occasionally attain a weight of upwards of sixty. Morgan records the capture of one which weighed sixty-three pounds. The increase in the size of the skull seems to continue nearly through life; in old age the skull not only acquires larger dimensions, but the weight is relatively greater in consequence of the increased thickness and density of the bones. The ridges for the attachment of muscles also become more strongly developed in old age."

The general color of the back of the Beaver is a reddish brown. The shade varies both with the seasons and with the geographical location. Those found farther to the northward are usually darker. Albinos, either pure white, nearly white or with white blotches, have been observed.

"The fur consists of an exceedingly thick, flaky, woolly coat of silky softness and a thin, long outer coat composed of strong, stiff, shining hair, short on the head and rear part of the back and over two inches long on the rest of the body." The tail, which is rounded at the base, much flattened and very broad, bears horny, dark-colored scales.

The fore legs are short and the feet are unwebbed. The hind legs are much stronger, the feet are fully webbed and they, alone, are used, with the aid of the tail, to propel the Beaver through the water. In the water it is graceful in its motions, but on the land, like nearly all animals that are fitted for a partially aquatic life, it is clumsy and awkward and its motions are neither rapid nor uniform.

Usually it is only in those districts that are remote from the habitations of man



BEAVER.
(*Castor fiber*.)
1: Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

that the Beaver lives in colonies, consisting of several families, and builds its "lodges." Nearer civilization it lives in burrows or tunnels. In the building of their homes, as well as in the storing of a supply of food, the female is the most active and is the practical builder, while the male assists.

Brehm writes interestingly regarding the Beaver. He says: "After mature deliberation the animals select a stream or pool, the banks of which afford them ample provender and seem specially adapted for the construction of their 'lodges.' Those which live singly dwell in simple subterranean burrows, after the manner of otters; societies, which generally consist of families, as a rule construct houses and, if there should be a necessity for it, dams, in order to hold back the water and preserve it at a uniform height. Some of these dams are from four hundred and fifty to six hundred feet long, from six to nine feet high, from twelve to eighteen feet thick at the base and from three to six feet at the top. They consist of logs varying in size from the thickness of an arm to that of a thigh and from three to six feet long. One end of the log or stake is thrust in the ground, the other stands upright in the water; the logs are fastened together by means of thin twigs and made tight with reeds, mud and earth, in such a way that one side presents a nearly vertical, firm wall to the stream, while the other side is sloped. From the ponds rising above the dams, canals are constructed to facilitate the carrying or floating of the necessary construction materials and food. Beavers do not forsake a settlement they have founded unless the direst necessity compels them to do so. Beavers' lodges, the origin of which dates very far back, are often found in lonely woods."

The Beaver usually feeds upon the bark of the younger branches of trees and shrubs and upon their leaves. It will also strip the older branches, in a very skillful manner, and eat the inner tender portion of the bark. During the fall and early winter months they work constantly in preparing and storing, in the neighborhood of their lodges, the winter's supply

of food. "Each cabin has its own magazine, proportioned to the number of its inhabitants, who have all a common right to the store and never pillage their neighbors."

The American Indians look upon the Beaver with great respect. They believe that it is possessed of a degree of intelligence second only to that of man. Some Indians even assert that it possesses an immortal soul. Its sagacity is certainly very strong and it will easily adapt itself to changed environments. Unlike the other rodents, it seems to reason before acting and will build its habitations in the form that the surrounding conditions demand for the construction of the most durable home.

The Beaver, especially when young, is quite easily domesticated. Various writers speak of finding tame Beavers in Indian villages, where they seemed to be perfectly at home and contented. They were allowed full liberty. "They seemed to feel quite comfortable in the society of the Indian women and children; they grew restless in their absence and showed much pleasure on their return."

The young, which number from two to three, are born blind, but are covered with fur. They usually obtain their sight in from eight to ten days, and are then led to the water by the mother.

Early in the nineteenth century Dr. George Shaw wrote as follows regarding the habits of the Beaver: "They collect in September their provisions of bark and wood; after which they enjoy the fruits of their labors, and taste the sweets of domestic happiness. Knowing and loving one another from habit, from the pleasures and fatigues of a common labor, each couple join not by chance, nor by the pressing necessities of nature, but unite from choice and from taste. They pass together the autumn and the winter. Perfectly satisfied with each other, they never separate. At ease in their cabins, they go not out but upon agreeable or useful excursions, to bring in supplies of fresh bark, which they prefer to what is too dry or too much moistened with water."

PAU-PUK-KEEWIS AND THE BEAVERS.

Over rock and over river,
Through bush, and brake, and forest,
Ran the cunning Pau-Puk-Keewis;
Like an antelope he bounded,
Till he came unto a streamlet
In the middle of the forest,
To a streamlet still and tranquil,
That had overflowed its margin,
To a dam made by the beavers,
To a pond of quiet water,
Where knee-deep the trees were standing,
Where the water-lilies floated,
Where the rushes waved and whispered.

On the dam stood Pau-Puk-Keewis,
On the dam of trunks and branches,
Through whose chinks the water spouted,
O'er whose summit flowed the streamlet.
From the bottom rose the beaver,
Looked with two great eyes of wonder,
Eyes that seemed to ask a question,
At the stranger, Pau-Puk-Keewis.

On the dam stood Pau-Puk-Keewis,
O'er his ankles flowed the streamlet,
Flowed the bright and silvery water,
And he spake unto the beaver,
With a smile he spake in this wise:

"O my friend Ahmeek, the beaver,
Cool and pleasant is the water;
Let me dive into the water,
Let me rest there in your lodges;
Change me, too, into a beaver!"

Cautiously replied the beaver,
With reserve he thus made answer:
"Let me first consult the others,
Let me ask the other beavers."
Down he sank into the water,
Heavily sank he, as a stone sinks,
Down among the leaves and branches,
Brown and matted at the bottom.

On the dam stood Pau-Puk-Keewis,
O'er his ankles flowed the streamlet,
Spouted through the chinks below him
Dashed upon the stones beneath him

Spread serene and calm before him,
And the sunshine and the shadows
Fell in flecks and gleams upon him,
Fell in little shining patches,
Through the waving, rustling branches.

From the bottom rose the beavers,
Silently above the surface
Rose one head and then another,
Till the pond seemed full of beavers,
Full of black and shining faces.

To the beavers Pau-Puk-Keewis
Spake entreating, said in this wise:
'Very pleasant is your dwelling,
O my friends! and safe from danger;
Can you not with all your cunning,
All your wisdom and contrivance,
Change me, too, into a beaver?'

"Yes!" replied Ahmeek, the beaver,
He the king of all the beavers,
"Let yourself slide down among us,
Down into the tranquil water."

Down into the pond among them
Silently sank Pau-Puk-Keewis;
Black became his shirt of deer-skin,
Black his moccasins and leggins,
In a broad black tail behind him
Spread his fox-tails and his fringes;
He was changed into a beaver.

—Henry Wadsworth Longfellow, "The Song of Hiawatha."

What rosy pearls, bright-zoned or striped!
What freckled surface, iris-dyed!
Fluted and grooved, with iv'ry lips,
Spotted like panthers, peacock-eyed!

Look closer, as the angels can,
And you will see the fairy work—
The ruby specks, the azure veins,
That in the tiniest hollow lurk.

—Walter Thornbury, "Shells."

SNAILS OF THE OCEAN.

Many of my readers have doubtless spent some of the vacation months at the sea shore and have wandered over the beach at low tide picking up shells and other objects left by the receding ocean. They have also, I am sure, peered into the little pools of water left on the beach and have watched with interest the captives imprisoned therein, hermit crabs, fiddler crabs, sea anemones, sea worms and snail shells. It is with the latter that the present article will deal.

The stretch of beach which is uncovered twice a day by the receding of the water is called "between tides," and is inhabited by a host of animate creatures, chief among which are the mollusks. The marine snails outnumber all of those which we discussed in the last article, and their shells are far more beautiful, those found in the tropics having the most gaudy colors imaginable. The animals are formed on the same plan as those of the fresh-water snails, although each family has some peculiarity not shared by its relatives. All live in the water and breathe air through that medium by means of gills, similar to the second class of fresh water snails mentioned in the last number. They are found in all parts of the world, those of the tropics, however, being the most brilliantly colored. While the majority of species live either between tides or near low water, there are not a few which live in the abysses of the ocean, and have been dredged from the bottom of the sea at a depth of two thousand, seven hundred and forty fathoms, or, to put it more plainly, over three miles. The average depth at which mollusks are found in any number is about one thousand fathoms. The variability of marine snails is so great that we shall be able to call attention to but a limited number of typical forms.

Among the best known of the marine snails are the Tritons, a family of mollusks living in tropical seas. Their shells are generally large and highly-colored and variously ornamented with short spines and knobs. One species, the *Triton tritonis*, is among the largest of mol-

lusk, measuring eighteen inches in length. One of the smaller Tritons is pictured on the plate. Another shell familiar to those who have visited Florida is the *Fasciolaria* or banded snail, which attains a length of three inches and is very prettily banded and dashed with color. A near relative of this species is the giant banded shell (*Fasciolaria gigantea*), which is the largest of all marine snails, growing to a length of nearly two feet. This species is found plentifully on the southern Atlantic coast of the United States, being particularly abundant about the coral reefs of the Florida Keys.

A genus of mollusks with light horn colored shells, and inhabiting the cold waters of the Arctic seas, is the *Buccinum*, or whelk. In various parts of Great Britain it is known as "buckie" and "mut-log." The *Buccinum* delights to burrow in the sand, like the moon shells (*Natica*), and frequently nothing but the end of the siphon can be seen, the latter protruding from the sand to enable the water to enter the animal to furnish the necessary oxygen. The whelk is used economically, both for food and bait. One ingenious method of catching them is to fasten a dead fish of good size in a wire basket and to allow it to rest on the bottom for a short time; when taken up it is covered with large, fat whelks. This fishery in Great Britain is fully as valuable as our oyster fishery, the annual income from this industry reaching to thousands of pounds sterling. The animal is also one of the principal baits used in cod fishing. A related genus, the *Neptunea* shells (*Neptunea*), is also eaten by the poorer people and makes a good codfish bait. The two kinds of whelk (*Buccinum* and *Neptunea*), are termed, the first the white whelk and the second the red or almond whelk, probably on account of the colors of the two shells. In the Shetland Islands the red whelk is used as a lamp, being suspended by strings from a nail, the mouth placed uppermost and filled with oil.

The basket shells or dog-whelks are among the most numerous in individuals

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



FROM COL. CHI. ACAD. SCIENCES.

MARINE SHELLS.

COPYRIGHT 1901, BY
A. W. MUMFORD, CHICAGO.

406

- | | | |
|------------------------------------|-----------------------------|------------------------------|
| Cypraea pantherina (Red Sea) | Cassis flammea (Bahamas) | Conus marmoreus (Polynesia) |
| Buccinum undatum (U. S.) | Pasciolaria distans (U. S.) | Voluta musica (West Indies) |
| Tritonium olearium (Naples) | Oliva trisaeps (Amboina) | Nassa glans (Amboina) |
| Ianthina communis (Atlantic Ocean) | Chiton squamosus (Jamaica) | Lottia gigantea (California) |

of all the marine snail shells, the common black whelk (*Nassa obsoleta*) being the most common of all the mollusks. The writer has seen a mud flat at low water literally paved with the shells of this snail, there being millions of the little creatures crawling about. The shells of this family are frequently very handsome, being latticed by the crossing of lateral and longitudinal lines. They are mostly of small size, scarcely exceeding an inch in length, many of them being much under these dimensions. The animal is very rapid in movement and leaves a distinct track in the mud, which will frequently end at a little pellet of mud, which, upon examination, will disclose the little animal nicely concealed beneath.

The Nassas of France are very destructive to the oyster beds of that nation, an adult "borer" being able to perforate the shell of a large oyster in a single night. So numerous are these pests that a single acre has yielded over a thousand individuals. As a result of these depredations the French oystermen carry on a relentless war against the *Nassa*, destroying thousands of animals annually. With all this persecution the mollusk still exists and even increases in numbers. The dead shells of this genus are a favorite home for the hermit crabs of small size, and it is to be suspected sometimes that other than dead shells are appropriated. We fear that a sort of piracy is resorted to by the hermit crab, resulting in a kind of "walk-the-plank" end for the mollusk, before the new tenant takes possession of the "home."

Of the many varieties of tropical shells, few exceed the Volutes, or bat shells, in beauty or variety of coloration. They are found in most parts of the world, although strangely enough none are now living in the seas of Europe, but they are most abundant and more highly colored in the tropics and subtropics. The animal is carnivorous, and the long, fang-shaped teeth are certainly suggestive of predaceous habits. The shells are variously colored, some being mottled, some with zigzag or lightning-like markings, while others have spirally arranged dots and lines. One species (*Voluta musica*, figured on the plate), has received its name from a more or less fanciful resem-

blance of the surface of the shell to a musical staff, the spiral lines being grouped in sets of four or five and the dots being arranged as notes. In some specimens this resemblance is quite close. The smooth and polished shell of some volutes is due to the fact that the greater portion is covered by a reflected part of the large foot.

On the sandy shores of subtropical beaches certain graceful and polished animals bury themselves from sight in the sand. These are the olive shells (*Oliva*) whose bright colors and highly polished surfaces rival even the gaudy *Volute* in beauty. The foot may be described as plough-shaped and is admirably adapted for digging rapidly in the sand, so that the shell may be hidden from sight on the approach of enemies. The long siphon is thrust up through the canal in the anterior part of the shell and its end protrudes above the sand. The high polish of the surface is due to the shell being enveloped in the voluminous foot; hence it has no epidermis. The aperture is so narrow that it is difficult to understand how the animal gets in and out. The olives are very numerous in individuals; when one is found hundreds are sure to reward a patient search.

Probably no more distinct family of mollusks exists than the Conidae, the family of cones, their beautifully decorated shells and the large number of species making them a favorite with collectors. The shell is in the form of an inverted cone, gracefully rounded, the aperture being but a narrow slit extending nearly the whole length of the shell. The colors of the cones are always very brilliant, although when they are alive the shell is not brilliantly polished as the olives, on account of the presence of an epidermis. About three hundred species are known, living principally in tropical seas. They love to conceal themselves in holes in the rocks and among the branches of corals. The animal is predaceous, boring into the shells of other mollusks and extracting the juices from the bodies. The teeth of *Conus* are hollow and very sharp and have a barb on the end. A poison gland is said to be present in this genus and bites from the animal are very painful, although not

dangerous, the large *Conus marmoreus* being able to inflict a severe wound. The cone is quite pugnacious and will immediately bite the hand when picked up, a veritable reptile of the ocean.

The ne plus ultra of mollusks to the collector is without doubt the genus *Cypraea*, comprising the cowry shells. So eagerly have they been sought by wealthy collectors that the price of rarities has gone up to an astonishing degree, some specimens being sold at several hundred dollars each. The shell is highly polished, owing to the fact that two lobes of the voluminous mantle are turned back over the shell and meet in the middle of the back. The foot is very large and spreading, the mantle beset with curious little tentacular-like organs and the eyes are placed on small swellings near the base of the long, cylindrical tentacles. The color-patterns of the shell vary to a wonderful degree. The young shell has a thin epidermis, a sharp lip to the aperture and a more or less prominent spire, the rolled over and toothed lip and polished surface not being acquired until fully adult. No more beautiful sight can be imagined than one of these gorgeous animals, as seen through the clear water, crawling over the sandy bottom or on the branch of some coral.

Several of the cowries have a curious economic value. Thus, *Cypraea aurantia*, the orange cowry, was used as an insignia of royalty by the chiefs of the Friendly Islands, and for a long time the only specimens obtainable were those which had been bored and used. The money cowry (*Cypraea moneta*) has been used as money by the natives of Western Africa, and many tons of this small shell were annually imported to England to be used in barter by the African traders. The shell is of a yellowish or whitish color, does not exceed an inch in length, and is very common in the Pacific and Indian Oceans. It is still used as a medium of barter in parts of Africa, although other things have pretty generally taken its place.

Cameos were at one time quite in the fashion, both as ornaments for the person in the way of brooches, and as bric-a-brac about the room. These shell-cameos are made from the genus *Cassia*,

the helmet shells. These are well adapted for this purpose, as the shell is made up of several differently colored layers, making a bas relief figure not only possible but very effective. The black helmet (*Cassia madagascariensis*) is one of the best for this purpose, the figure being carved from the white, outer layer of shell, which stands out very clearly against the black background of the second layer. When a cameo is desired simply as a brooch or for any other form of personal adornment, a piece of the shell is cut out and shaped into the required form and size—oval, square or other shape—and cemented to a block of wood. The figure is then traced on the shell with a pencil and finally carefully worked out with sharp, pointed steel instruments, of delicate size and form. The same process is resorted to in working out a bas relief on the entire shell, only the latter is placed in a vice or other object to hold it firmly. The home of this industry is Genoa and Rome, Italy, although some are produced in France; these latter, however, are of a poorer quality. Several thousand people are employed in this trade. Many beautiful examples of this work were exhibited at the World's Columbian Exposition, in Chicago, in 1893.

The cameo shells are among the largest of sea snails, several of them measuring eight or ten inches in length and weighing several pounds. They are found only in tropical and subtropical seas, living in comparatively shallow waters on a sandy bottom. They are voracious eaters, living principally on bivalve mollusks.

One of the most abundant of mollusks is the violet sea snail (*Ianthinia communis*), which spends its life floating in the waters of the Atlantic Ocean. The shell is very delicate, resembling in form some of the land snails, and has but two colors, both shades of violet, a deep color on the under side (which, by the way, is always turned upward when the animal is floating in the water), and a lighter shade on the upper side. So fragile is the shell that it seems as if a breath would break it. The most interesting fact in connection with this mollusk is the wonderful float or "raft" which is secreted by the foot, and to the under side of which the

eggs are attached. The latter are not all in the same condition. Nearest to the animal they are more or less fresh; those in the middle of the float contain embryos and fully formed young, while those on the outer end are empty, the young having escaped into the water. The genus is gregarious and may be found in almost countless numbers. After a severe storm they are sometimes cast upon the beaches in vast numbers, where they soon die under the fierce rays of the sun.

We have thus far been dealing with snails whose shells were formed in a spiral coil. Quite a number of mollusks are not protected by such a shell, its place being taken by a flat, shield-like disk, or several distinct plates placed side by side. The most familiar of the first is the limpet or *Patella*, which is a depressed, conical, oval disk, looking not unlike a miniature shield. They live on rocks, to which they cling with great tenacity. The animal seems to have a pretty clear idea of local geography, for it invariably returns to the same place after its excursions for food and the rock in some localities has been hollowed out to a considerable depth by the continuous dwelling thereon of the limpet. The large foot is very strong and it is almost impossible to dislodge the shell from the rock when the animal becomes alarmed and is aware that danger is near. While grazing along the sides of a rock covered with fine seaweed, it will leave a track like a worm and will clean off quite an area in a very short space of time.

Another species is the key-hole limpet (*Fissurella*), distinguished by having a slit or foramen in the apex of the shell. The shells of *Fissurella* are generally rougher than those of *Patella*, and as a rule they live in warmer seas. In the limpet we find a departure from the general form of both animal and shell, both being bilaterally symmetrical, that is, having both sides alike. In the mollusks which have been presented thus far, the body has been twisted in the form of

a spiral, making one side different from the other and causing the organs of one side to become atrophied. In the limpets the organs are paired, as they are supposed to have been in the ancestors of the living mollusks.

The most peculiar of all the mollusks, so peculiar, indeed, that they constitute a separate order (*Polyplacophora*) are the Chitons, or coat-of-mail shells. The shell is made up of eight separate pieces or plates, each locking with the other, the whole supported by and buried in a coriaceous mantle which forms a margin all the way around. This must not be confounded with the true mantle of the animal, for it is only a part of the shell. It is beset with bristles, spines or hairs, which add much to the peculiar appearance of this mollusk.

The Chitons live for the most part on rocks at low water and are said to be nocturnal in habit, feeding only at night. Their movements are slow and they appear to be very sluggish in all their actions. When detached and taken from their rocky homes they have the provoking (to the collector) habit of rolling up and are sometimes very difficult to straighten out again. There are about two hundred and fifty living species, found in all parts of the world.

In the foregoing pages we have called attention to a few types of marine snails, and what has been written has hardly more than touched upon this vast field. There are thousands of different species even more interesting than those which have been mentioned. There are the beautiful ear shells, or Abalones, the little periwinkle, so largely used as an article of food in Europe, besides a host of others too numerous to mention. The brief notes and the figures on the plate will convince the reader, it is hoped, that these inhabitants of the deep are not only beautiful and worthy of our attention and study, but are also of much practical and economical use to man.

Frank Collins Baker.

THE LEMON.

In 1636 an English report on the affairs of the navy gravely remarked that "the use of lemon is a precious medicine and well tried. Take two or three spoonfuls each morning and fast after it two hours." The value of the fruit for certain disorders of the system seems to have received an early recognition. This was especially true with regard to scurvy, which in earlier days caused widespread mortality among seafaring men. Hawkins, in 1593, made the statement that more than ten thousand men had succumbed to the malady within the limits of his naval experience. The Crusaders under Louis IX. were severely attacked by scurvy, owing to their abstinence from fresh meat during Lent, and the history of the disease shows that it is occasioned by a lack of fresh meat and fruits. The efficacy of lemon juice was recognized by Drake, Davy, Cavendish, Dampier and many others years ago, and time has but added to the value of the fruit, while it has made it accessible to everyone. While Pomona is generally credited with having devoted her entire attention to the cultivation of the apple, it is stated on authority of an old Greek myth, that she gave considerable thought to the development of the Lemon and the orange. It appears that Pomona inclined not her ear to the supplications of her many admirers until Vertumnus, discerning her vulnerable point, presented the fair gardener with a grafting, which, under her skillful cultivation, developed into a lemon tree, and, as a reward, the favor of the wood-nymph was bestowed upon the youth.

Whether or not such was the origin of the Lemon, the fact remains that the fruit is most useful and the tree exceedingly attractive. Originally a native of Asia, it has become widely distributed in Europe, Africa and America, and although far more susceptible to injury from frosts than the orange, the trees are successfully cultivated under many conditions. Doubtless the best results in this country have been obtained in California. Thousands of acres around

San Diego are planted with lemon trees while large districts in the Ojai Valley, Ventura, Santa Barbara, Pomona and Los Angeles counties are devoted to its cultivation. The tree is remarkable for beauty, and while it seldom attains large proportions, its pale green leaves, loosely-hanging branches, showy and fragrant flowers, together with the fruit that is found in all stages of development, produce a pleasing and highly ornamental effect. While the best crop of Lemons is generally gathered between December and April, the fruit should be picked every month for ten months of the year, in order to retain the best results. As a rule, the trees yield from one hundred and twenty-five to one hundred and forty boxes of the fruit to the acre, about the sixth year, but this number is increased to four hundred boxes when the groves reach an age of ten years.

The varieties of Lemons are distinguished chiefly by their size and form, and may be roughly classified as egg-shaped with blunt nipples and oblong lemons with large nipples. The sweet lemon and thin-rind Poncine and Naples belong to the firstclass, while the second includes such forms as the imperial, the Gaëta and the wax. The principal varieties grown in California are the Lisbon, Eureka and the Villa-Franca. Of these, the Eureka originated in California, while the Villa-Franca was imported from Europe. Besides the grateful quality of the juice, the expressed oil of the rind is used in the arts and has an intense odor of lemon, and the Pundits of Benares, quote a Sanskrit work, written about 1354, in which the oil is described as a valuable medicine. The acid pulp of the Lemon, after rasping off the rind, is pressed for citric acid, while the otos of the Lemon, orange and bergamot, the preparation of which forms the chief industry of Sicily, are leading ingredients in the preparation of "Lisbon Water" and "Eau de Portugal."

—Charles S. Raddin.



LEMON.
(*Citrus limonum*.)

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

TWO WRENS.

The house wren is one of Nature's illuminated successes. It has been said that there is no second spring, yet to-day (July 20th) this bird is in the full glory of spring-time melody. He sings from the top of a telegraph pole, the song caught up and repeated by some country cousin in the grove, a musical argument carried on all day long and left at night in the same unsettled state in which morning found it. Whether they are discussing the relative merit of their respective claims, a town residence or a country seat, I am unable to decide; it is certain, however, that the concessions of neither party infringe upon domestic dignity.

Their speech is a revelation of supreme content, a liquid, flexible measure with ripples and cascades bubbling through and over, a dash of pure color amid July's neutral tinted emotions.

The day may be dark and threatening, the sun concealed in gloomy banks of cloud, rain falling, or thick mists obscuring the valley; each and all are powerless to dampen his ardor or to effect his extreme optimism. He clings to his creed with persistent closeness, asserting valiantly the ecstasy of finding one's self alive and emphasizing the statement by a perfect wave of melodious argument.

There are hours when he sings with such force that his whole little body catches the key-note and natural rhythm; the melody becomes compounded of his very substance, body of his body and soul of his soul. It is an inundation of musical notes, cascadic, cataclysmic, the tide of song rising till it drowns his personality; he is no longer a bird but an animated song.

My little neighbor is a pattern of husbandly devotion, a lover-husband over whom coming events are already casting tender shadows before, the special event

in this instance being located in a crevice beneath the eaves of the house.

Wren babies had not left the first nest when Jenny Wren's husband was hard at work upon a second house, which was ready for occupancy before the first family were self-supporting. This was an admirable arrangement in the way of time-saving, as eggs are often laid in the second nest before the first is vacated.

Though the new house lacked the freshness of coloring and the picturesqueness of the swing of a nest in the sunshine, Jenny Wren made no complaint of being cooped up in the darkness, and as to her husband, he was quite as well pleased with the glamor and wonder of its art as if it had been wound with blossoms and sprinkled with star-dust. A bird with different tastes might have urged that it was only a little hole in the house-jet, yet everything in life depends upon the point of view from which you regard it. Judged from the wren standpoint, it was considered admirably adapted to the family needs, nor could the most critical observer fail to see here a literal illustration of that familiar truth: Happiness is from within.

Standing upon a ladder I counted eight eggs as my eyes became gradually accustomed to the partial darkness within the nest; the dark, vinaceous spots laid on so thickly as to conceal or obliterate the original color, thus helping to hide them more securely. In the long brooding days, when Jenny's little answering heart is preoccupied and silent, the hours are sometimes long and lonely to her mate. At these times he has been known to devote his spare moments to building a nest simply for his own pleasure. Many instances of this remarkable habit are recorded of the English wren, the explanation offered being that the odd nests are

for the purpose of deceiving the parasitical cuckoo.

There is also a supposition that the bird's active nature finds relief in work, being urged on by the increasing loneliness. This wren-trait reaches a climax in the marsh wrens, with whom the building habit becomes a passion.

Nor is it restricted to the wren family, many instances being recorded where other species have beguiled the waiting days by an imitative housekeeping.

The house phoebe has been known to build a second nest while its mate was brooding. To all appearances this was an instance of over-developed domestic tastes. Nor did the experiment end with the completion of the duplicate nest upon which the male bird sat regularly for several hours daily.

Wrens do not take kindly to double houses, their warlike nature seeming to revolt against living friendly with near neighbors. A pair of wrens that was well established in an unoccupied martin house made it very uncomfortable for the later arrivals. While the martins were abroad after material for the nest the wrens sallied forth in an utterly vindictive spirit and scratched out all their neighbors had constructed. After singing a triumphant song with much parade they wisely retired to their own domicile to be on the defensive.

Wiser wrens, with an instinctive knowledge that an ounce of prevention is worth a pound of cure, are known to have the forethought when the box in which they build contains two compartments, to fill up one of them, thus avoiding the risk of troublesome neighbors. Wrens have been known to nest in a human skull. Others with less questionable taste, have gone to housekeeping in an old boot, a watering pot, a coat sleeve; in gourds and baskets, jars and water pipes, while another pair made a nest in the lower part of a stone vase in the garden. There was a hole for drainage in the bottom of the vase, and through this hole they found, beneath some shavings, a circular space just suited for a nest. The vase was not filled with plants until the domestic affairs of the wren family were happily concluded.

The delicate swaying hammock of the

oriole is sometimes used for a second nesting.

There was bitter disappointment in wren circles earlier in the season when, with the presumption of inexperience, the pump was filled regularly with coarse twigs, which were promptly dislodged at nightfall. Undiscouraged at this defeat, the morning hours were utilized for rebuilding with a persistency well worthy a more intelligent effort; they worked and sang, sang and worked, until a cigar box was nailed to a tree for their special accommodation. This was nearly full of twigs when they decided that the building-site was ineligible, a decision hastened by the fact that just at this opportune time a glass fruit can was left upon the piazza shelf. No sooner was this glass house seen than its possibilities were realized and plans were quickly made for a kind of crystal palace experiment. Under other circumstances this might have been a dangerous precedent, as certain unneighborly conduct toward their little brothers of the air had at various times fairly invited the throwing of stones. The can was half full of tiny fagots, and Jenny was thinking of settling upon the mattress of wood fibre when the thrifty housewife turned them adrift summarily, well aware that this kind of housekeeping, within easy range of neighboring cats, would not be successful. Before such supreme content, who could have the heart to undeceive them? And yet, the can was turned upside down before they could be made to understand the situation. Like Thoreau, they did not wish to practice self-denial unless it was quite necessary!

After the failure of this crystal scheme, it was a difficult matter for Jenny to make up her mind as to a further preference, but when she really decided it was with such entire good faith as left no doubt in her lover's mind as to her judgment. This was more flattering as it was his own choice, their last year's home thoroughly remodeled, to which he had repeatedly called her attention, vainly. So the hole in the house jet at least answered the question, "Where are the birds in last year's nests?" for the wrens moved in regularly, the tenor having a perch upon a projecting bracket where Jenny joined

him, a regular little termagant, scolding with all her might whenever the kittens looked that way.

Marsh wrens, small brown birds, with barred wings and tail, breed in or about the swamps and marshes of Lake Champlain.

They are intensely interesting from their habit of constructing several nests but one of which is utilized for house-keeping. After the real nest is made and the first egg laid, the male stays closely at home busying itself with building several nests, which are to all appearances entirely superfluous. In locating these he does not go beyond the immediate neighborhood of the true nest.

Some have thought that these sham nests are used as hiding places for the male, a Lilliputian watch tower or guard house, from which close watch is kept over the home property. Whether Mrs. Marsh Wren really needs such close watching, being more inclined to flirt than the ordinary feathered spouse, or because she is a better wife, so infinitely precious that she must be guarded from every side, is, as yet, an unsolved question. "Love holds the key to all unknown," and though there is little to admire in a deportment made fine by compulsory measures, no doubt both parties understand the situation, which is quite enough for practical purposes. These nests, conspicuous from their size and exposed position, are securely attached to the upright swaying reeds, some of which penetrate their substance. They are lined with soft grasses and have an entrance at one side, often nearer the bottom than the top. Mr. Burroughs, who has found the marsh wren's nest surrounded by half a dozen make-believes, says the gushing, ecstatic nature of the bird expresses itself in this way. It is simply so full of life and joy and of parental instinct that it gives vent to itself in constructing sham nests; the generous-hearted creature being willing to build and support more homes than can be furnished or utilized.

Entering the Lake Shore drive at St. Albans Bay, where dense tangles border the swamp beyond, you are sure to hear a song that is unmistakably wrennish. You have glimpses also of a small brown

bird bubbling over with a nervous energy that betrays itself in every note he utters. Wait quietly and he approaches, but go one step in his direction and he recedes to the swamp where human foot may not follow.

Push your boat up the creek, the only avenue leading to his abode, that tantalizing song leading on meanwhile like the Pied Piper of Hamelin, though unlike the latter there is no disillusioning at the end. Red-winged blackbirds take wing as you enter the twilight of soft green and amber shade and the far-off music of their jangle-bells becomes less musical, the males striving "to recommend themselves by music, like some awkward youth who serenades his mistress with a jewsharp," and using the air or the alder tops as a parade ground upon which to exhibit their musical evolutions. And yet you are witness to many a voluntary bit of sentiment that will increase your interest in this scarlet epauletted regiment, descendants of the dusky tribe that anchored long ago in this peaceful haven, going out and coming in with the tide until the legend of their coming is as vague and shadowy and misty as that of the golden-fleece voyageurs—the Argonauts. They ebbed and flowed with the stream; came at the proper time and season without knowing why; anchored and launched their ebony ships when it was time for sailing.

Here and there along this waterway the branches clasp hands above the creek, forming an arch of green within which vines sufficiently elegant to warrant exclusiveness cling in unaffected grace to the alders, without inquiring or caring as to the pedigree of their support. It is sufficient for them that the support is there.

A whole half mile along the stream and trees and bushes disappear, leaving a dense mass of reeds, the marsh wren's "ain countrie," out of which he is never at his best and to which he gives you no welcome.

Birds, like persons, have wonderful powers of concentration upon one topic, woe be to you if that topic happens to be yourself!

Every denizen of the swamp regards you with suspicion, watching each move-

ment as closely as if you were a dangerous character traveling under an alias, and could not be trusted to sail upon this ruddy ocean in which their lordships have anchored their private yachts. Push your boat far in among the reeds and cat-tails, into the sea of shadows over which no sluggish current sends a ripple, and certain globular nests in the tangled reeds reward your search. Push your fingers within these nests and in one only, here and there, will you find from five to ten dark eggs, a rich reward for all your trouble.

Meanwhile the "neighbors, and the marsh wren generally has numbers of

them, have doubtless been charming you with their bubbling, gurgling song, always half the colony singing at once, or, one bird rising above the reeds gives the order, as it were, and the whole colony joins in the chorus. The song is quite beyond their control; they seem filled to overflowing with an inexhaustible supply of music, which trickles down the reeds, like gathered-up drops of water charged with music.

"Sometimes, like a mine of melody, it explodes within them and lifts them from the dark recesses of the flags into the air above." Nelly Hart Woodworth.

WHEN SPRING COMES.

Again the birds will weave their nests,
And come and go on airy wing;
And one will nurse her little guests
And one will watch and sweetly sing.

The bushes small and towering trees
Their leaves of living green will don,
And, swaying in the restless breeze,
Will laugh because old Winter's gone.

—George Gee.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



CUBEBS.

CUBEBS.

(*Piper cubeba* L.)

Aromatics, as cubebs, cinnamons and nutmegs, are usually put into crude poor wines to give them more oily spirits.—Floyer, "The Humors."

The cubeb-yielding plant is not unlike the pepper plant and belongs to the same family (Piperaceae). The two resemble each other in general habits in the form of inflorescence and in the fruiting.

Cubebs were known to Arabian physicians as early as the ninth century, who employed them as a diuretic in kidney troubles. It was also known at that time that Java was the home of the plant. At one time it was believed that the Carpesium of ancient writers was cubebs, but this is now generally disbelieved. Edrisi states that cubeb found its way to Aden about 1153. During the twelfth and thirteenth centuries it was employed medicinally in Spain. Originally it was doubtless employed as a spice, similar to pepper. Mariano Sanudo (1306) classed it among the rare and costly spices. Hildegard referred to the soothing properties of cubeb. In the thirteenth century cubeb is mentioned among the import articles of London. About the same time it found its way into other European countries, notably Germany. At the beginning of the nineteenth century cubeb disappeared almost entirely from medical practice. About 1820 English physicians of Java again began to employ it quite extensively.

As in the case of black pepper, the fruit

is collected before maturity and dried. The fruit is about the size of the pepper, but has a stalk-like prolongation which distinguishes it. The pericarp becomes much shriveled and wrinkled on drying.

Cubebs are cultivated in special plantations or with coffee for which they provide shade by spreading from the trees which serve as their support. Their cultivation is said to be easy.

Cubebs have a pungent, bitter taste and a characteristic aromatic odor. It cannot readily be confounded with any of the other more common spices. Its use as a spice is almost wholly discontinued. Its use in medicine is also waning, since it evidently has only slight medicinal properties. It is used in nasal and other catarrhal affections. Cubeb cigarettes are used in the treatment of nasal catarrh. It has a marked influence upon the kidneys, causing irritation and increased activity, and as already indicated it is therefore a diuretic. It is, however, harmful, rather than beneficial, in acute inflammatory conditions of these organs.

Description of Plate—A, twig with staminate flowers; B, fruit-bearing twig; 1, upper portion of staminate inflorescence; 2, staminate flower; 3, fruit; 4, 5, 6, 7, ovary; 8, 9, seed.

Albert Schneider.

A TREE-TOP TOWN.

Before the cradled violets awake beneath the grass,
Or any but the crocuses and catkins have come back,
Always 'tis then the loveliest thing of all things comes to pass,—
A twit-twit-twitter on the mild spring breeze,
A twit-twit-twitter in the leafing trees,
Through which small sky-blue wings flash out a sky-blue track—
For blue-birds, first adventurous house-builders of the year,
Are at their old, wise tricks again of settling far and near.

Not long, 'tis when the hyacinths and tulips bloom in rows,
And lilies-of-the-valley start to whitening on their stems,
And woodsy things are opening fast to make a new out'-doors,
Then robin-redbreast on a sunny day
Comes taking life his usual charming way,
With a blithe and merry Che-che-chem-chem-chems!
While yet dry leaves and building twigs are left upon the ground
"I thought I'd come to the old place and take a look around."

Then later, when the grasses curl, a-tilt in taller growth,
And nooks for snuggeries are made by grape and ivy-vines,
When lilacs stand in purple, and the plum-trees blossom forth,
Comes here a lilting, gay, and gaudy troop,
Tits, thrushes, bobolinks, blue-jays with noisy whoop,
Kingbirds, wild tumblers in the air, drunk with ethereal wines;
Then cardinals, and indigoes, and finches find the place,
And so the town-site in the trees grows populous apace.

One waiting for the apple-blooms is he who's always late,
The oriole: his building-site none e'er disputes with him.
Though last to come he has full leave to settle, with his mate,
And hang his hammock up to rock and swing,
To flout the town on breezy, orange wing
From where his house sways airily adown a pendant limb.
And now the high, green tree-top town, which welcomes ev'ry comer,
Has settled to the business of singing out the summer.

—Austin Arnold McCausland.

BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IX.

MAY, 1901.

No. 5

MAY.

May brings all the flowers at once,
Teased by rains and kissed by suns;
Now the meadows white and gold;
Now the lambs leap in the fold.
May is wreathed with virgin white;
Glad May dances all the night;
May laughs, rolling 'mong the flowers,
Careless of the wintry hours.
May's storms turn to sunny rain,
And, when Iris springs again,
All the angels clap their hands,
Singing in their seraph bands.
—Walter Thornbury, "The Twelve Brothers."

Now, shrilleth clear each several bird his note,
The Halcyon charms the wave that knows no gale,
About our eaves the swallow tells her tale,
Along the river banks the swan, afloat,
And down the woodland glades the nightingale.

Now tendrils curl and earth bursts forth anew—
Now shepherds pipe and fleecy flocks are gay—
Now sailors sail, and Bacchus gets his due—
Now wild birds chirp and bees their toil pursue—
Sing, poet, thou—and sing thy best for May!

—William M. Hardinge, "Spring."

AUDUBON'S ORIOLE.

(*Icterus audubonii*)

The name oriole is from the French word oriol, which is a corruption of the Latin word aureolus, meaning golden. The name was originally applied to a vire, but is now used in a much wider sense and includes a number of birds.

The true orioles are birds of the Old World and are closely related to the thrushes. It is said that no fewer than twenty species from Asia and Africa have been described.

The orioles of America belong to a very different group of birds and are related to our blackbirds, the bobolink and the meadowlark. All these birds belong to the family Icteridae, the representatives of which are confined to the New World.

The genus of orioles (*Icterus*) contains about forty species, chiefly natives of Central and South America. The plumage of nearly all the species is more or less colored with shades of yellow, orange and black.

Audubon's Oriole, the male of which we illustrate, has a very limited range, including the "valley of the Lower Rio Grande in Texas and southward in Mexico to Oaxaca." It is more common in central and eastern Mexico than in any other part of its range. In the summer, it only frequents the denser forests of its Texas home, but during the winter months it will approach the inhabited regions.

The Mexicans capture these Orioles and offer them for sale. In captivity, however, they seem to lose their vivacity and will not sing. "When free their usual song is a prolonged and repeated whistle of extraordinary mellowness and sweetness, each note varying in pitch from the preceding."

It is said that this beautiful bird is frequently called upon to become the foster parents of the offspring of some of those birds that have neither the inclination to

build their own nests or to raise their own families. The ingenious nests of the orioles seem to be especially attractive to these tramp birds which possess parasitic tastes.

The red-eyed cowbird (*Collothrux robustus*), of the Southern United States and Central America, seems to be the pest that infests the homes of Audubon's Oriole. It has been stated that the majority of the sets of eggs collected from the nests of this Oriole contain one or more of the cowbird's eggs. It is also probable that many of the Oriole's eggs are destroyed by the cowbirds as well as by other agencies, and thus, though the raising of two broods the same season is frequently attempted, the species is far from abundant.

Regarding the nesting habits of the Audubon's Oriole, Captain Charles Bendire says, "The nest of this Oriole is usually placed in mesquite trees, in thickets and open woods, from six to fourteen feet from the ground. It is a semipensile structure, woven of fine, wire-like grass used while still green and resembles those of the hooded and orchard orioles, which are much better known. The nest is firmly attached, both on the top and sides, to small branches and growing twigs and, for the size of the bird, it appears rather small. One now before me measures three inches in depth inside by about the same in inner diameter. The rim of the nest is somewhat contracted to prevent the eggs from being thrown out during high winds. The inner lining consists of somewhat finer grass tops, which still retain considerable strength and are even now, when perfectly dry, difficult to break. Only a single nest of those found was placed in a bunch of Spanish moss and this was suspended within reach of the ground; the others were attached to small twigs."



AUDUBON'S ORIOLE.
(*Icterus audubonii*).
 $\frac{2}{3}$ Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

The number of eggs vary from two to five and "sets of one or two eggs of this Oriole, with two or three cowbird's eggs, seem to be most frequently found, some of the first named eggs being thrown out to make room." The eggs are ovate in form and the general color varies from white with a bluish cast to white with a grayish cast and in some instances a purple shade predominates. The markings vary greatly both in color and form. They may be either thread-like, in streaks or in blotches. In color they may be various

shades of either brown, purple or lavender.

The food of Audubon's Oriole consists of insects and, to some extent, of berries and other fruits. Mr. Chark, who studied the habits of this species in Texas, says that he observed it frequently feeding on the fruit of the hackberry. He also states that these birds were usually in pairs and exhibited a retiring disposition, preferring the thick foliage of the margins of streams rather than that of more open and exposed places.

Seth Mindwell.

TO A SEA-BIRD.

Sauntering hither on listless wings,
Careless vagabond of the sea,
Little thou heedest the surf that sings,
The bar that thunders, the shale that rings,—
Give me to keep thy company.

Little thou hast, old friend, that's new,
Storms and wrecks are old things to thee;
Sick am I of these changes, too;
Little to care for, little to rue,—
I on the shore, and thou on the sea,

All of thy wanderings, far and near,
Bring thee at last to shore and me;
All of my journeyings end them here,
This our tether must be our cheer,—
I on the shore and thou on the sea.

Lazily rocking on ocean's breast,
Something in common, old friend, have we;
Thou on the shingle seek'st thy nest,
I to the waters look for rest,—
I on the shore, and thou on the sea.

—Bret Harte.

FROM AN ORNITHOLOGIST'S YEAR BOOK.

THE HEART OF A DRYAD.

I.

It was an oak wood. A few hickories and chestnuts grew there, but the oaks ruled; great of girth, brawny of limb, with knotted muscles like the figures of Michael Angelo or Tintoretto's workmen in his painting of the Forge of Vulcan. As to coloring, the oaks were of the Venetian painter's following, every oak of them! In summer they were "men in green," rich, vigorous green, with blue shadows between the rustling boughs; in early autumn, though russet in the shadow, the sunshine showed them a deep and splendid crimson, pouring through them like a libation to the gods of the lower earth, and to the noble dead, for the Dryad had a heart for heroes and all oak-like men.

Immediately before the great winds came, stripping them bare, and dashing silver cymbals to wild airs of triumph, they wore a sober brown, but it put on a glow, as of bronze or heated metal after a rain, when the sun's rays smote them with shining spears smiting aslant with unwonted glittering. Under the moon or after a freeze they were all clad in steel, armor of proof, and mighty was the tumult, as of meeting swords, when the great boughs swung, and the long icicles fell upon ice below.

But these days were far off. It was summer, and a crystal brook slipped from level to level, singing its sweet water-song, and bringing cool water to bathe the feet of the oak which the Dryad loved and decked with green garlands. The orioles loved it, flashing here and there with rich red gold or flame-like orange on breast and wings and soft, velvety black on head and shoulders, splendidly beautiful as some tropic flower, they chose the end of an oak bough to hang their pensile nest. The male oriole shone in the sun, but his mate glowed with a duller hue, an orange veiled with gray, and mottled and spotted or splashed

with white and fuscous and black, as a brooding creature should be that sits all day long amid the play of fleeting light and shade upon constant color. But both were beautiful in their strong and darting flight, and their labors of love.

The mother alone fashioned the nest, weaving it strongly of grasses and bark, of fibre, hair and string, and lashing it firmly near the end, a hanging cradle for the wind to rock at will and safely, and beautifully adorned with a fantastic pattern of green oak leaves, woven across, and aiding to conceal the nest itself. The eggs, four to six, were white, but marked with strange characters, sometimes distinct, sometimes obscure, a hieroglyphic of black or fuscous lines, over which the mother brooded patiently for many days. But the male oriole was not indifferent, even while the young were in the egg. He did not fear to expose himself upon an upper branch, where he could watch untiringly over the safety of the beloved nest and all day long, in bright or cloudy weather, floated down to his silent mate a song of courage and tenderness.

Ah, no shepherds in far-off Arcady ever piped more sweetly to their beloved than this winged lover! His note is wild and free, a touch of anxious pleading perhaps in the brooding song that one does not catch in the first triumphant cry of joy with which he flashes upon our sight in April, but inexpressibly sweet and liquid. It is essentially music of the pipes, like the soft airs blown by lips of happy children upon reeds cut from the brookside in the first joyous days of spring, but it is different in its airy quality, as if a melody, unfinished, were floating far above our heads! They are loving householders, and, if undisturbed, will return, year after year, to the same nest.

Happy is the Dryad that dwells in an oak where the orioles build and sing!

Ella F. Mosby.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



MARbled GODWIT.
(*Limosa fedoa*).
About $\frac{2}{3}$ Life-size.

THE MARBLED GODWIT.

(*Limosa fedoa.*)

—I behold

The godwits running by the water edge,
The mossy bridges mirrored as of old;
The little curlews creeping from the sedge.

—Jean Ingelow, "The Four Bridges."

The Godwits form an interesting group of the shore birds (*Limicolæ*) and belong in the same family as the snipes and sandpipers. They command attention not alone because of their habits, but also because they have for centuries been considered a delicate food for man, and much has been written in praise of their flesh.

Early in the sixteenth century one of the European species was rated as "worth three times as much as the snipe," and was considered a delicacy of the French epicure. We are told that the black-tailed Godwit in the year 1766 was sold in England for half-a-crown. Ben Jonson speaks enthusiastically of this bird as a delicate morsel for the appetite.

The origin of the name Godwit is veiled in obscurity. It has been suggested that it may be a corruption of the two words good and the antiquated word wight, the latter meaning swift, though the Godwits are not birds of very rapid flight.

The Marbled Godwit belongs to a genus (*Limosa*) which, though not rich in the number of species, has representatives throughout the Northern Hemisphere. This bird frequents muddy pools and marshes and wet, sandy shores. It is this habit that suggested to the naturalist the generic name, which is derived from the Latin word *limosus*, meaning muddy.

As is the case with many of our game birds, this species bears a number of common names, such as the Straight-Billed Curlew, the Marbled or Brown Marlin, the Red Curlew and, among sportsmen, the Dough and the Doe Bird.

With the exception of the long-billed

curlew the Marbled Godwit is the largest of the "Bay Birds." These two birds closely resemble each other in coloration, but may be easily distinguished by the characteristics of the bills, which are very long. The terminal half of the bill of the curlew is curved downward, while that of the Godwit is either straight or slightly curved upward.

The geographical distribution of the Marbled Godwit includes the whole of North America, though it is infrequent on the Atlantic coast. Its nesting range is chiefly limited to the interior from Iowa and Nebraska northward to the Saskatchewan. In winter it migrates to Central America, Cuba and the northern part of South America.

In company with the long-billed curlew and some species of sandpipers it builds its nest on the grassy banks of rivers and ponds, usually in some natural depression. Occasionally, however, the nests are found on moist prairies some distance from a stream. In these grass-lined nests are laid the three or four bright olivaceous, drab or creamy buff eggs that are variously spotted or blotched with varying shades of brown. They are domestic and seemingly devoted to their fellows. When one of their number is wounded and unable to fly they will frequently remain in the vicinity, flying around the spot where lies their wounded comrade.

Dr. Coues tells us that "on intrusion near the nest the birds mount in the air with loud, piercing cries, hovering slowly around with labored flight, in evident distress and approaching sometimes within a few feet of the observer."

Its food consists of the smaller

crustaceans, worms, snails, insects and their larvae. These are captured from the surface of the water, on the shore or are probed for, with the long, sensitive bills, in the soft soil of the banks or under shallow water. When feeding it moves in an easy and graceful manner. Its grace and dignity well merit the saying that "it is one of the most beautiful of the birds sought by the sportsman.

Neltje Blanchan has very aptly described the habits of this bird. She says: "It is not the intention of the Godwit to give anyone a near view of either plumage or bill. The most stealthy intruder

on its domains—salt or fresh water shores, marshes or prairie lands—startles it to wing; its loud, whistled notes sound the alarm to other marlins hidden among the tall sedges, and the entire flock flies off at an easy, steady pace, not rapid, yet not to be overtaken afoot. A beautiful posture, common to the plovers, curlews, terns and some other birds, is struck just as they alight. Raising the tips of the wings till they meet high above the back, the marlins suggest the favorite attitude of angels shown by the early Italian painters."

A BIRD-JOKE AT LEAFY LAWN.

In early spring Robin Redbreast returned to Leafy Lawn and selected a new site for his nest in the same apple tree his father and grandfather had occupied during preceding summers. No other birds had yet arrived and Robin jumped about on the sprouting lawn master of all he surveyed.

He soon discovered to his sorrow that those selfish, quarrelsome sparrows who tormented the birds last summer and drove away the wrens, had gone no farther during the winter than to the eaves of a near barn, and were already back to their nest in the tall poplar, scolding and threatening as disagreeably as ever. But Robin noticed that the limb which held their nest so high was dead and he hoped a strong wind would dash limb, nest and ugly sparrows all to the ground.

Robin looked very handsome in his crimson vest, hopping over the grass in a scalloped path, with his modest little mate following in a similar path beside him. Suddenly they stopped and listened.

"Surely that is Mr. Woodpecker

pounding on the tin roof-drain," said Robin; and Mrs. Robin looked about curiously and spied Mrs. Woodpecker on a near tree listening to her husband's wonderful drumming. Mrs. Woodpecker was thinking what a fine nest such a strong husband could cut out and what quantities of corn and nuts he could hammer into the bark of the trees for an extra food supply. In a very short time the woodpeckers selected the balm-of-Gilead tree by the gate for their home and the work began of cutting and tossing the tiny shavings and so making a hole large enough to accommodate Mrs. Woodpecker while she sat over the ivory eggs waiting the day of their hatching.

Mr. Woodpecker was recognized as king of Leafy Lawn, perhaps because of his lordly manner and fine clothes. He always wore a jet black coat and white satin vest, and what was queer on a king, a large scarlet bonnet.

A few days after the arrival of the Woodpeckers, Robin saw Mr. Blue Jay making a circuitous route to the tall pine

and he knew the Jays had located there. Though Mr. Blue Jay was always cautious, trying to deceive every one concerning the whereabouts of his home, he himself knew every other nest in the yard.

So persistent was he in patrolling Leafy Lawn, jumping from tree to tree and from branch to branch, reporting his presence, and in case of danger threatening, squawking so loudly and repeatedly, that it was agreed, as he already had a blue uniform, that he should be the policeman for this precinct.

There came a day early in the season when Mr. Woodpecker, Robin Redbreast and Mr. Blue Jay all assembled within speaking distance on the lower branches of a silver maple tree and excitedly discussed the arrival of a number of birds which they had heard early that morning but had been unable to find.

"My wife," said Robin, "awakened me from the twig near her nest, where I usually sleep and keep guard, and she said that one of our kin had arrived for she had heard a voice exactly like mine from the plum tree. Hoping it was one of my brothers I searched eagerly until sunrise, and though I heard him twice I could not find him."

Mr. Blue Jay was more excited than before and turned about, twitched his tail violently, scolded and sputtered that he had had just such an experience and he believed the sparrows had added witchcraft to their other sins and were trying to hoodoo the birds of Leafy Lawn.

A frightened sparrow overheard this accusation and came near enough to protest that they were not guilty and had been themselves trying in vain to find their newly-arrived English relatives, whom they had believed they heard that morning.

Mr. Woodpecker said it might be no personal affair of his as he had heard no drumming nor mocking of his song, but if Leafy Lawn were to be occupied by kildares, bobolinks, meadow larks and blackbirds he thought there would be scarce picking of worms, bugs or seeds

for the old settlers who were the rightful possessors of these premises and it was a serious condition of things. In closing his pompous speech he shook his scarlet bonnet furiously, smoothed his waistcoat and jumped upon a higher limb and called off his "chit-it-it-it-it" so shrill and high that his companions were for the moment alarmed lest he should split his throat. But he stopped as suddenly as he had begun, and upon the silence that followed the birds heard, as surely as they saw the blossoms on the apple trees, the song of the thrush.

"It is undoubtedly a hobgoblin," hoarsely whispered Mr. Woodpecker, "for Mr. Blue Jay swore to me this morning that during the seasons he and his ancestors have patrolled this lawn never have they seen a thrush even alight here."

It was decided that the three birds make one more immediate and thorough search for the monster hobgoblin which infested the Lawn.

Imagine their chagrin when they saw tilting upon the unleaved twig of a late catalpa tree a modest little gray bird with keen, bright eyes, who commenced a garble of all their songs called off in such merriment that the birds could not but appreciate the sport. Then the stranger, who was no other than Mr. Cat-bird, a cousin to the brown mocking-bird of the south, gave a weird cry exactly like a cat's meow which so frightened the birds they flew hastily away to their several homes.

Mr. Cat-bird was welcomed to Leafy Lawn, for his beautiful voice was an esteemed acquisition to the morning chorus, but he could not deceive the birds again with his imitative songs.

Many a time, however, he would sit upon the corner of the house roof and perpetrate his joke on the boy in the hammock below, who thought he knew much about birds, but who could not understand why, when he heard so many different voices, there was only a little gray cat-bird within sight.

Gertrude Southwick Kingsland.

THE RUSTY BLACKBIRD OR GRACKLE.

(*Scolecophagus carolinus.*)

Unlike the other blackbirds and our common orioles the Rusty Blackbird must not be sought in the orchards and fields of our farms and waysides, but in our forests and the heavily wooded banks of mountain streams and lakes. In such places this retiring bird passes the breeding season and raises its family in quiet solitude. It even seems to shun the company of its own kind and, unlike the red-winged blackbird, is seldom seen in large flocks. It is only in the spring that we may observe even small flocks from "whence issues a confused medley of whistles, sweeter and higher-pitched than the best efforts of the redwings." Captain Charles Bendire says: "The ordinary call note sounds like 'tehack, tehack,' several times repeated; another like 'turnlee, turnlee, turnlee,' uttered in a clear tone and varied occasionally to 'trallahee, trallahee.'"

Few birds exhibit a more happy disposition. They seem always to be perfectly satisfied with their surroundings. One writer, quietly watching them, gathered in the trees about him, says that "The wind whistled loudly through the branches above, but these lively fellows began a serenade so joyous and full of gleeful abandon that I lingered long to hear them. In singing they opened the bill widely and the throat swelled with melody. Their notes are rich, varied and energetic. They are almost constantly in motion, chasing each other or flying from perch to perch, singing merrily most of the time."

The Rusty Blackbird has a wide range. It is more common in the eastern portion of North America from Florida and the Gulf of Mexico northward to the northern limit of the forests. Westward, though constantly decreasing in numbers as the distance increases from the Atlantic coast, it is found as far as the great plains and very rarely on the eastern slopes of the Rocky Mountains. It frequents practically the whole forest

area of British America from the Atlantic to the Pacific ocean. Mr. E. W. Nelson says: "I found it abundant at the Yukon mouth, where the widely extended areas of bush grown country offered suitable shelter and where it consequently nested in considerable numbers."

Their nesting range covers the whole of British America, but in the United States it is restricted to a comparatively small area. Its nests have only been reported as occurring in portions of New England and in the wild Adirondack forests. In winter it makes its home in the Middle and Southern States. At this time, from necessity, it is often seen around barn and stock yards, feeding on the grain that has been dropped by the cattle.

During the summer season the Rusty Blackbird depends almost entirely on animal life for its food, eating caterpillars, moths and other insects, worms, snails and spiders, also eating, to a limited extent, wild berries.

The nest of the Rusty Blackbird is large and substantially constructed. It is generally placed in cone-bearing trees and is seldom more than ten feet from the ground. As a rule, trees growing in swampy and rather inaccessible places are selected. The base of the nest "is principally composed of sphagnum moss and earth, forming a firm, hard platform on which the nest proper is built. This is thickly covered on the outside with small tamarack and spruce twigs, mixed with a few blades of grass, pieces of fern and long green moss, especially at the base. The inner cup is thickly and neatly lined with fine bright green grass." These blackbirds are not quarrelsome and are devoted parents, both sexes assisting in the care of the young, which are able to leave the nest in about fifteen or sixteen days. Our illustration shows the fall and winter plumage of the male. During the breeding season the plumage is a glossy bluish black.



LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

WHAT EVOLUTION MEANS.

If any person devoted his time to the correction of popular errors, there is no probability that he would have any spare moments for eating or sleeping. The serious aspect of the present condition of popular knowledge, however, is the apparent absence of desire upon the part of many young people to grasp the principles of natural science. I am not exaggerating when I say that there are plenty of fairly educated persons in every large city who deny that man is an animal, and who insist that a whale must be a fish, because it lives in the sea.

Everybody professes to be aware in a sort of unconscious way that the theory of Evolution was invented by Mr. Darwin, and patented by Mr. Spencer, the most important points in the doctrine being that all men are descended from monkeys which had lost their tails, that the fittest survived, and that there is a "missing link" between man and his ancestors.

These ideas have little foundation in fact. Darwin no more discovered Evolution than Edison discovered electricity; we are not descended from any existing ape, with or without a tail, and no competent person ever asserted that we were; and there are good reasons for saying that such palaeontological "links" as are missing are not of the greatest possible importance. In short, whatever is evolutionary in the popular mind, is a burlesque upon the evolutionist's true opinions.

Charles Darwin was born in 1809, on the same day as Lincoln, but, long before Darwin's time, evolution had become a recognized force in science. Kant, who lived from 1724 to 1804, and Laplace (1749-1827) had worked out the development of the sun and the planets from white-hot gas. Lyell (1797-1875) had worked out the evolution of the earth's surface to its present condition; and Lamarck (1744-1829) had shown that there is evidence of the descent of all animals, as well as all plants, from a few ancestors by gradual modification. Again, Her-

bert Spencer, during Darwin's lifetime, began to work out the growth of mind from the most simple beginnings to the highest development of human thought.

The philosophies of the ancients were all of them founded upon limited observation; they were merely speculative fancy-pictures evolved from the author's own consciousness. Modern science, however, is of quite a different character. It has relegated certain fundamental propositions to a region called "the Unknowable" (this means at present unknowable), and it permits everybody to explain these propositions by means of any hypotheses which may occur to him. In other words, modern science does not deal with such phenomena as are at the present day outside the range of the human intellect; and I venture to warn the reader that speculation concerning matters upon which we have as yet no scientific data is waste of time. Modern science is founded upon investigation and observation, and the evidence is always weighed as carefully and as impartially as are the statements of witnesses in a law court.

One naturally asks: "What is Evolution?" "Continuous change according to certain fixed laws," is a reply which may have some value, although it is quite insufficient. A technical definition, given by Mr. Spencer, is as follows:

"An integration of matter and concomitant dissipation of motion, during which the matter passes from an indefinite, incoherent heterogeneity, to a definite, coherent homogeneity, and during which the retained motion undergoes a parallel transformation." Anybody who will think about this definition will be able to appreciate its meaning, provided a good dictionary is at hand.

Evolution is not another word for Development, and Mr. Spencer has carefully distinguished the one from the other; but the details are too technical for notice in this paper. Evolution may be regarded as "a general term for the history of the steps by which any living be-

ing has acquired the morphological and physiological characters which distinguish it." Development is "the process of differentiation by which the primitively similar parts of a living body become more and more unlike one another." Both definitions are Huxley's.

The evolution of organic matter now claims attention in detail. Of the origin of first life, we know absolutely nothing. The doctrine of Evolution does not deal with that. There are, however, many hypotheses upon the subject. Lord Kelvin, the eminent physicist, has suggested that unicellular life may have been transferred to this globe from a wrecked planet. This hypothesis obviously aids us very little, for it merely transfers the original scene of action to some other world. Personally, I prefer the idea that the first protoplasm was produced by the action of the sun upon inorganic matter not unlike the colloids, and that it "fed upon the previous steps in its own evolution." In this connection, I may say that two points are certain—viz., that vegetable life preceded animal life, and that the first forms of life were mere specks of jelly, without organs. Can these primitive specks be created at the present time? Or, in other words, can protoplasm be manufactured by artificial processes? The answer must be No; not by any process now known, although a great number of experiments have been made with the object of manufacturing unicellular vegetable life. During the years between 1870 and 1880, this question was thoroughly thrashed out, and at first the balance seemed to be very evenly held between the supporters and the opponents of spontaneous generation. The investigations of the late Professor Tyndall, however, conclusively proved that biogenesis, that is, all life from previous life, is the condition at the present day. But I must add Huxley's words of warning, viz., "that with organic chemistry, molecular physics, and physiology yet in their infancy, and every day making prodigious strides, it would be the height of presumption for any man to say that the conditions under which matter assumes the qualities called vital, may not some day be artificially brought together." And further, "that as a matter not of proof but of probability, if it were

given me to look beyond the abyss of geologically recorded time, to the still more remote period when the earth was passing through chemical and physical conditions which it can never see again, I should expect to be a witness of the evolution of living protoplasm from non-living matter."

The first protoplasm must be extremely ancient, for the remains of sea-weeds are found in the oldest strata, and vegetation implies the manufacture of protoplasm from inorganic matter.

When the earth was in the condition to which Huxley referred, the constantly decreasing heat, and the recurrence of the seasons produced, by slow degrees, changes in the congenital character of the forms of life. Every individual varied somewhat from its predecessors, and those forms which possessed variations most suitable to the environment were the ones which eventually survived. The transition from the protophyta, the lowest class of vegetable life, to the protozoa, the lowest class of animal life, must have been a very simple matter in the condition in which the earth then was. Indeed, today the difference between the lowest microscopic animals and the lowest microscopic plants is by no means clearly defined.

Innumerable hosts of life made their appearance upon our planet while the surface was going through the cooling process, and they were, at first, of course, of the most primitive kind. But the same laws were always at work, viz., no two living things were exactly alike when they made their appearance upon this earth, although the differences between several forms might be very slight. Variation was, and is, the order of the day.

The individuals which possessed variations in accordance with the environment persisted, while those having injurious variations had a tendency to disappear. Congenital variations were (and are) transmitted with great certainty. This is Mr. Darwin's "Process of Natural Selection," called by Mr. Spencer "The Survival of the Fittest."

The other Darwinian factor in evolution is Sexual Selection. It is that department of Natural Selection in which sex is especially concerned. Anything which

exhibits the prowess or beauty of the one sex attracts the other, and decides the preference for one individual over another, with the result that those individuals which are unattractive to the opposite sex are unable to reproduce their kind. The importance of this factor will be appreciated if I give an extract from Darwin's "Descent of Man" (Vol. II., p. 367). "For my own part," wrote our great master, "I conclude that of all the causes which have led to the differences in external appearance between the races of men, and to a great extent between man and the lower animals, sexual selection must have been by far the most efficient."

As I have already said, Darwin neither invented nor discovered the doctrine of Evolution. But he placed it upon a firm foundation by the discovery of the two great factors to which I have referred, and, by incessant observation and indomitable energy, he demonstrated the truth of them beyond any reasonable doubt.

The proofs of the truth of Evolution are of two kinds—palaeontological and embryological. The palaeontological evidence has found its way into popular books, and even into some of the literary newspapers. The history of the horses, of the crocodiles, of the rhinoceros is known in detail. All the stages have been found which intervene between the four-toed Eohippos of the Lower Eocene and the zebra and horse of the present day. Thanks to the late Professor Marsh, of Yale, not only are the successive steps in the evolution of the foot-structure preserved, but so also are the various stages in the evolution of the teeth. The occasional appearance of a three-toed horse points very plainly to a three-toed progenitor, a striking example of atavism, that is, the reappearance of a characteristic which has "skipped" one or more generations.

If the principle of heredity be true, one would expect to find in the development of animals, and plants traces of the line of descent. "If Evolution be true, one ought to find, following back the development of the egg, that specific details would vanish and give rise to more generalized features; that the earlier the stages, the more the embryos of related

forms would resemble each other." This is exactly what is found, there being, in a vast number of instances, a remarkable parallel between the palaeontological record and the embryological evidence. A detailed examination of the facts would not be intelligible to anybody who is not a practical biologist; but I am fully warranted in asserting that every organism in the course of its life-history (technically called ontogeny) is a recapitulation of the history of the race—technically known as phylogeny.

There is other evidence in abundance. The phenomena named atavism is a part of that evidence. Almost everybody has seen well-defined and regular stripes upon horses, and nobody doubts that they indicate a zebra-like ancestor. Again, in the inner side of the human eye is a little red fold, known as the plica semilunaris, the remnant of an ancestor which possessed a third eyelid, similar to that possessed by some reptiles and birds of to-day.

Who are the supporters of the doctrine of Evolution? Practically the whole scientific world. The late Professor Marsh, the distinguished palaeontologist, when president of the American Association for the Advance of Science in 1878, said:

"I need offer no argument for Evolution, since to doubt evolution is to doubt science, and science is only another name for the truth." Professor Marsh meant, of course, not that evolution is to be taken "on trust," but that it has been so thoroughly proved that new arguments in support of it are unnecessary.

Concerning Natural Selection, sometimes called Darwinism, the late Professor Huxley said (quotation from Darwin's "Life"): "I venture to affirm that so far as all my knowledge goes, all the ingenuity and all the learning of the hostile critics have not enabled them to adduce a single fact of which it can be said this is irreconcilable with the Darwinian theory."

I occasionally hear the old argument that species are immutable—that a species is something which never changes. It seems a little late in the day to revive this contention, but it is necessary to be prepared with a reply. The critics of Dar-

win's theory of "the Origin of Species by Natural Selection" have always refused to give a tangible definition of the word "species," and, as a result, the real difficulty turns upon that point. What is a species? Linnaeus said: "There are as many species as an infinite Being created at the beginning," a statement which is a confession of faith, and not a scientific definition. We must remember, of course, that Linnaeus died as long ago as 1778. The truth is that all the various tests for species have proved faulty, that of the fertility of hybrids having little more value than many of the other so-called "tests." In classification, the word "species" means the lowest subdivision to which a name is usually applied, and to aid the zoologist's or botanist's memory, some system of classification is, I need not say, an absolute necessity.

According to the view of the anti-evolutionists, most of whom are not scientific men, descendants of a common ancestor must belong to the same species. Nevertheless, the late Mr. Romanes has shown that the rabbits of Porto Santo, an island in the Atlantic, about twenty-five miles from Madeira, descended from the European stock of nearly 500 years ago, will no longer breed with their continental cousins.

When we remember that some wild animals will not breed in captivity, the idea of sterility as a test of species seems utterly unscientific. I venture to say that there can be no accurate definition of species in terms of physiology, for every individual has its peculiarities, chemical as well as physical, and the real difficulty is to decide when these peculiarities are important enough to make it useful to give a precise name to their possessors. Assume for a moment that a species is a group of individuals agreeing in essential characters which remain constant from one generation to another. But what are essential characters and how much constancy is demonstrated? Upon these points no two biologists are likely to agree. For example, taking the birds of Germany, Bechstein says there are 367 species; Brehm says there are 900. Ac-

cording to Reichenbach there are 379, and Meyer and Wolf tell us there are 406.

The idea of a species is based upon structural resemblances between individuals, and the degree of importance attached to these depends upon the mind of the particular observer.

There are two reasons why nobody has seen one species turn into another. The first is that until the word "species" is satisfactorily defined, instances of the evolution of new forms cannot be supplied. Secondly, as nobody lives much beyond a hundred years at the most—a mere moment in Nature—our ability to witness marked changes in animals or plants is extremely limited. Minor changes, of course, are frequently noticed. I ask the reader to remember, however, that the flower-garden and the farm-yard are in an artificial condition, Natural Selection having ceased. For instance, the duck which has defective wings when hatched has as good a chance of surviving as the duck with powerful wings.

Who are the opponents of the doctrine of Evolution? In the scientific world they are difficult to find. Professor Virchow, of Berlin, the distinguished pathologist must, I think, be classed as one, although his verdict is really "not proven." Professor Haeckel, however, has pointed out that the opinion of a pathologist, no matter how eminent, upon the subject of evolution cannot carry much weight.

Until recently we had with us two men of science whose opposition to some portion of the doctrine of evolution was of importance. These men were Sir William Dawson, the Canadian geologist, and Mr. Mivart, the English anatomist. Both of these gentlemen have died within the past two years.

Having now written a brief outline of the doctrine of Evolution, I believe that I cannot do better than conclude this very imperfect sketch with a quotation from the immortal Shakespeare:

"The truth can never be confirmed enough.
Though doubts did ever sleep."

Lawrence Irwell.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



FROM COL. CHI. ACAD. SCIENCES.

412

SURF SCOTER.
(*Oidemia perspicillata*).
About $\frac{1}{2}$ Life-size

COPYRIGHT 1901, BY
A. W. MUNFORD, CHICAGO.

THE SURF SCOTER.

(*Oidemia perspicillata*.)

The Surf Scoter is also known by several other popular names, such as the Surf Duck, the Surf or Sea Coot and, not infrequently, the Booby. The name Velvet Duck, though more commonly applied to the white-winged scoter, is also sometimes used to designate this species.

This Scoter is an American species and is only an accidental visitor to European coasts. Its range includes the "coasts and larger inland waters of northern North America; in winter, south to Florida, to the Ohio River and to San Quentin Bay, Lower California."

Our illustration is that of a male bird. The female is a sooty brown, silvery gray below and with much white on the sides of the head.

Immense flocks of the young of this species winter on San Diego Bay, California. Here the adult birds are of rather rare occurrence for they are able to withstand the rigors of an arctic winter and stay far to the northward where they are a common resident. In the vicinity of San Diego there was about one adult to every seventy-five or one hundred juvenile birds. The former may be easily distinguished by their very striking velvety black plumage, the white markings on the nape and forehead standing out in bold contrast. These white markings remind one of the white bull's eye on a target. Because of this striking color characteristic the Surf Scoter is frequently called the Target Head, by the California hunters.

They are wary birds and it is often necessary to make a long detour in order to reach a spot near to a flock, without attracting their attention, as they ride the crest of the waves in a heavy surf. The younger birds will remain in the surf so close to the shore that frequently they are cast high and dry upon the beach. When this happens it is very amusing to watch them awkwardly scramble back and enter the water again. The older birds are usually much more shy, remaining far out

on the water where they congregate in pairs, though sometimes there may be six or eight together.

As the tides enter San Diego Bay they carry in the loose seaweeds in which are entangled numerous dead starfish and other forms of marine life. These form the principal food not only of the Scoters but also of all the water fowls, such as other species of ducks, the cormorant, the pelican and the beautiful California gull.

The note of the Surf Scoter is to me the most pleasing of all the ducks. It is a soft, mellow whistle ending in a cluck! cluck!

Mr. Nelson states that the Surf Scoter appears in the vicinity of St. Michaels, Alaska, about the middle of May and nests commonly in the marshes of the delta of the Yukon river. It also nests in large numbers on the Atlantic coast from Labrador northward.

Dr. Coues, speaking of these birds as he observed them in Labrador, says, "They are tough birds and remarkably tenacious of life and require a heavy charge to kill them. They are known as Bottle-nosed Coots, a name given in allusion to the very peculiar shape and color of the bill."

Its nest, usually placed on grassy knolls, in fresh-water marshes near the sea, is made of dried weeds and grasses and lined with the down of the bird. It is evident that the female performs all the duties of incubating the eggs and carrying for the young, for during the nesting period large flocks are observable that consist entirely of males, constantly feeding in their accustomed haunts.

This ocean duck feeds "on small mollusks and fishes, for which it dives almost constantly, both in the sandy bays and amidst the tumbling surf, sometimes fishing at the depth of several fathoms and floating buoyantly among the surf of the raging billows, where it seems as unconcerned as if it were on the most tranquil waters."

Frank M. Woodruff.

A BACK-YARD CLASS.

The Farnum's back-yard was something disagreeable. Still it didn't matter much, thought the children, as long as the front yard was nicely kept and there was a high fence all around the back. Besides, Mr. Farnum was away from home traveling all the week; Mrs. Farnum was so busy that she hardly ever saw the disreputable yard, and the children, Rob, Lora and Baby Jim, liked best to play away from home.

At last it dawned on the mother's mind that they were hardly ever at home except to eat and to sleep and to get ready to go away again and she began to worry about it and wonder what she should do.

That very day Rob came running in to show a bug which he had in a bottle. It was such a queer looking specimen that all became interested in it at once.

"I'll keep it till papa comes back, he'll be sure to know!" exclaimed Rob proudly.

"But this is only Tuesday, my boy. You can't keep it in that bottle all the week without food or drink. It must not be left to starve," Mrs. Farnum replied.

"We'll find it something to eat," cried the children, and off they ran.

But this was not such an easy matter. Mr. Bug would not touch any of the back-yard "vegetables," as Rob called the variety of weeds that clung to the rotten fence boards or matted the ground of the large garden. In spite of their efforts the bug stuck to the corner of the bottle and refused to be comforted, with food, at least. At last, in despair, Rob ran to the drug store and asked what he could give the bug to "make it die a peaceful death."

"Just put a layer of pyrethrum in the bottom of your bottle," answered the druggist, "keep it corked tight, and you can make every bug in your yard die happy. Pyrethrum is a powder that is harmless to people (though of course you must not eat it), but the least smell of it kills insects."

Rob went home delighted. "I'll make a collection of bugs, as Sam Ward does of butterflies," he declared.

"I'd help you if it wasn't for those horrid spiders," said Lora. "I'm afraid as death of them ever since I read about a baby dying from a spider-bite."

"Pshaw! Only a few spiders are poisonous, that is, I think so. Let's get a library book about them and find out; then may be we'll have a spider collection, too," answered the practical brother.

While Rob was getting his bottles ready in which to "electrocute" the bugs and Lora was going to the library after the books, Mrs. Farnum was rummaging in the attic. At last she came down bearing triumphantly aloft a big old-fashioned work-box.

"This you may have for a specimen case," she said. "If you'll fit some little drawers in it, Rob, I'll line them with scraps of velvet and have a glass top put on."

The children set to work at once, and in vain the neighbors' children whistled for them on the other side of the high board fence. Lora took the hammock from the front lawn to swing beneath the old apple tree. But the tall weeds reached up to the hammock, so Rob had to go for the old scythe rusting in the fence corner and Baby Jim came dragging a hoe with which to cut them down. Soon they had a large space cleared under and around the apple trees, and when it was carefully raked and swept they ran in to beg their mother for some porch chairs for their "summer parlor."

Then Rob made for himself a camp-stool that he could carry around and plant among the bushes where he would sit watching for certain bugs to appear and trying to catch them in his bottle. Such patience as it took at first! And how little Rob had of it! But Lora read long, interesting chapters to him out of "The Insect World," and the specimen case grew so fast and became so fascinating that he found the patience quite worth while.

Whatever Rob did, of course, Baby Jim wanted to do.

"The ant-hill's mine! I 'scovered it!" he announced at supper one evening. "I'll make a fence wound it to keep the

wolves out, and I'll have the ants for my sheepses."

Mrs. Farnum did not look as pleased as the rest.

"I don't want the ants crawling all over you," she said.

"No, they won't; I'll take my red chair out and sit on it, like Rob does," he answered, solemnly.

The next day he set to work to build a big circular fence around his ant hill, working as perseveringly as ever any real shepherd did to get his fold ready, and accepting no help from Rob except allowing him to shave up a board to furnish the "palings." Then, day after day, while Lora swung in the hammock reading aloud to Rob, little Jim sat perched on his red chair herding his ant-flock.

"I feed them and they eat, but they never drink a tiny bit," he said.

"The ants find their drink away down in the ground, dear," replied his mother. "Now tell me what you have learned about your sheep."

"I learned a greedy lesson to-day," said Baby Jim. "One ant had some food and he met an ant who hadn't any, and he divided; then he went on some more and met another ant with not any, and he told him to come over to my chair-leg where the cookie was."

The family all laughed, and still more at Rob, who asked, "Is Jim going to be an ant-hropologist, papa?"

"Perhaps," answered Mr. Farnum. "Now, children, I have something nice to tell you. I have hired a man to come and help us improve the back-yard. He will cut the weeds and trim up the trees and bushes, and we can plan the walks and flower-beds for next spring."

"How lovely!" cried Lora.

"I don't know about that," said Rob, with an ugly pucker in his forehead. "It will scare all my bugs away. They like weeds and dirty places."

"Yes," admitted his papa, "but next spring you will have to go to the woods for new specimens."

"It won't scare my specimens away,"

laughed Lora. "I've been studying birds lately. You see when I become tired of reading I just lie back in the hammock and watch the birds in the tree-tops. They are so very smart, and they do the queerest things!"

So the plan to improve the yard suited all but Baby Jim, who wailed long and loud because his ant city would be destroyed. In vain did the family try to comfort him. He could not be persuaded to abandon his flock.

That night, to Jim's distress, a cold rainfall set in. "My sheeps will all be dwounded," he wailed! "I meant to make a 'bwella over them!"

"Look here," said Lora, drawing him up to the sofa beside her. "This is the picture of the inside of an ant-hill. Here is the top door where you see the ants go in, then they go down to this large room, then sideways to this one, then down, down, down."

Baby Jim's eyes opened very wide. He seized the book and studied the drawing long and earnestly.

"Your sheep are all down in the rooms now, having a nice Sunday, I think," continued Lora. "When winter comes and the snow is all over the ground they won't come up at all. Haven't you seen them carrying food in to pile up in one of their rooms?"

"O, and my cookies are all down there!" he cried in great delight.

When the man appeared in the morning Baby Jim marched out with an air of importance, and, after surveying the deserted ant-hill, he turned to the man and said, "My sheeps are all gone into the house to bed, so you can clean up their meadow if you want to."

And thus it was that the Farnum children began a study which will interest them as long as they live. There is no longer any need to worry about their living at the neighbors; and at last the Farnum back-yard has become not only respectable, but actually a "thing of beauty and joy forever."

Lee McCrae.

THE AMERICAN ELK OR WAPITI.

(*Cervus canadensis*.)

Centuries ago, before Columbus sailed the unknown seas which divided him from the New World of his dreams and ambitions, before the birth of De Soto, that adventurer whose discoveries and conquests were to unfold to the Old World the mysteries and fascinations of the new land, through the virgin forest and over the broad plains as yet unknown to the white race, roamed many animals which were widely distributed throughout North America.

They fearlessly sought those localities which would furnish them the most abundant supply of food and water. Unmolested except by their natural enemies, they multiplied and lived a free and untrammelled life.

In these early times the Wapiti or the American Elk, as it is commonly though erroneously called, was probably the most widely distributed quadruped in North America. Its range extended from the northern part of Mexico northward to Hudson's Bay and from the Atlantic to the Pacific Ocean. At the present time, however, but a few wild individuals are left in the United States east of the Mississippi and lower Missouri Rivers. They are occasionally met with in the wilder regions bordering Lake Superior, and it is reported that they are still living in the mountainous regions of Pennsylvania and Virginia. The advance of civilization, causing the cultivation of the lands and the destruction of the forests, has gradually driven this noble animal to the westward and into the wilds of British America. In the states bordering the Pacific Ocean and along the western tributaries of the Mississippi and the Missouri rivers it is still quite common. One writer tells us that "in the rich pasture lands of the San Joaquin and Sacramento it formerly was to be seen in immense droves and with the antelope, the black-tailed deer, the wild cattle and mustangs covered those plains with herds rivalling those of the bison east of the mountains or of the antelope in South Africa."

The name Wapiti is of Indian origin, and in their language is used to designate a Rock Mountain goat. The name elk so commonly applied to this animal should properly be limited to the moose.

The Wapiti is closely related and belongs to the same genus as the famous stag or red deer (*Cervus elaphus*) of Europe. This animal, which is smaller than the Wapiti, inhabits the forests of mountainous regions.

In both the Wapiti and the stag the senses of sight, hearing and smell are well developed. They will detect a human being or other animal when some distance away. Though their acute senses protect them, they are said to have poor memories as well as weak powers of comprehension. The Wapiti when listening raises its head and throws forward its erected ears. When entering the forest it will examine the surrounding open country and sniff the wind, seeking possible danger.

The antlers of both Wapiti and stag are much alike, though those of the former are longer and heavier, corresponding to its larger size. The full growth of the horns is attained about the seventh year. The perfect horns are slightly oval in transverse section and thickly covered with warts or slight elevations, which are arranged in longitudinal lines. All the branches or prongs are situated on the front side of the main trunk. "The general color is a light chestnut red, which deepens into a brownish hue on the neck and legs and almost into a black on the throat and along the median line of the under surface of the body. The buttocks are yellowish white, bordered by a dusky band which extends down the posterior surface of the hind legs." In winter the fur is much thicker and finer and the general color is more gray than in summer. "During the mating season the males have fierce combats, and at this time the male Wapiti emits a peculiar noise, resembling the braying of an ass, beginning with a loud shrill tone and ending in a



LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO

deep guttural note." At this time, even when kept in confinement, the male is easily irritated and may attack people. Old males will frequently wage persistent and long battles for supremacy. The antlers are used as the weapons in these duels, and cases have been recorded where these have become so firmly interlocked that they could not be separated, resulting in the death of both individuals.

When food is plentiful and the Wapiti is not constantly disturbed, it will remain in the same region, only straying away during the mating season. They assemble in herds of a greater or less number of individuals. The females and fawns usually remain together; the

older females without fawns form another herd and the old males, as a rule, lead a more or less solitary life, except during the mating season.

The Wapiti is more common in low grounds in the vicinity of marshes and well wooded tracts, where it feeds on grasses and the young branches and leaves of the willows and allied trees.

The Wapiti is graceful and proud in its bearing and very light in its movements. This is especially true of the male, which may be described as an animal of "noble carriage." When moving from place to place it walks rapidly and runs with remarkable swiftness.

A FRIENDLY FIELD MOUSE.

Many stories have been told in the past, tending to show that wild animals when in trouble will display surprising confidence in man, in fact will often seek his assistance when sore beset. The writer, when a boy upon a farm in Minnesota, had an experience with a field mouse which prettily illustrates this trait in wild creatures. It was stacking time and the men were all busy in the fields lifting the shocks of cured grain and stacking them in hive-shaped stacks in the barnyard. The writer, a barefoot boy at that time, had been following the wagons in the field all the morning in a vain endeavor to capture some field mice to take home as pets. He had seen a number of the drab little creatures with their short tails, but had failed to lay his hands upon any of them, owing to the thick stubble and the nimbleness of the mice. At last, as a particularly large shock was lifted, a broken nest was disclosed and the youthful mouser was put upon the qui vive by the slender squeaks of seven or eight hairless

little beings that were so young as not to have opened their eyes as yet. The mother disappeared with a whisk, whereupon the young hunter sat down in a critical attitude beside the nest and began to examine his find. He had already put one of the young mice in his trousers pocket when the mother reappeared out of the stubble beside the nest. The boy held his breath and awaited developments. Much to his surprise, the mouse-mother, after carefully examining the ruined nest, entered his pocket, which, as he sat, opened very near to the nest. She seemed to come to the conclusion very quickly that her lost little one had found a very good home, and in about two minutes had transferred the remainder of her offspring from the nest to the pocket, carrying them one at a time in her mouth.

The writer has had many varied experiences with wild animals, but none of them impressed him so strongly as the episode of the mouse-mother in the wheat stubble. J. Clyde Hayden.

THE OPENING OF WINTER BUDS.

In our cold temperate zone spring means chiefly the changing of the trees from their naked winter condition to the beautiful green leafy appearance of early summer. When stripped of their foliage, trees present to the observant eye a great variety of form. The tall, slender poplar can easily be distinguished from the spreading elm as far as it is seen; as, also, can the rough-barked hickory, with its clinging strips of bark, from the smooth beech.

Usually, the opening of buds seems to take place almost in a single night, but they really open very gradually. Now, these buds are all formed the summer before, but they are so small that they are scarcely noticed in the midst of the many leaves. In the winter, however, they are readily seen; and, then, when the first warm rains fall in the spring they start to swell, and gradually grow larger until, suddenly, they burst through their snug winter coats, and show the tiny, green leaves that have been concealed in the thick, dark, outer covering.

The buckeye bud is one of the largest of the winter buds. It is covered with small, pointed, brown scales, which overlap each other, thus keeping the cold from the more delicate parts within. Underneath these hard outer scales are thinner, half-transparent ones. Their color is a delicate pink, and fine veins line them. Snugly wrapped inside these dainty coats are tiny woolly objects, and when the wool is removed they are found to be miniature leaves folded together so compactly that they occupy very little room. If the bud has grown on the end of the twig a very small flower bud will be enclosed within the leaves; but if it has grown on the side there will be no flower bud. Since these leaves and flowers have all been formed the summer before, it is easy to understand that a few warm days will cause them to grow so that they soon become

too large for their winter covering, and suddenly burst it open.

The trees are forced into a period of inactivity by the cold, so, if a twig is broken off, and placed in moderately warm water, in a warm, light place, the buds on it will open just as they do in the spring and their development may be easily watched.

Often a tree will have a countless number of buds; and since growing buds need much light and nourishment only the stronger ones will grow, the weaker ones remaining in a resting state. These resting buds are called dormant buds, the word dormant coming from the Latin word "dormio," which means "to sleep." The buds often continue in this dormant state for several years, becoming weaker and weaker all the time, until finally they die. If, however, the stronger buds are killed at any time, as by a late frost, the dormant ones suddenly become active, and grow to take the place of the ones that were destroyed. This shows us how cleverly trees provide substitutes for cases of emergency. These dormant buds then might even be compared to the understudies of the stage.

The regular places for buds to grow are in the axes of the leaves or on the end of the twigs. Buds, however, can be made to grow on unusual places. If the tops of the tree are cut off, as we often see them in the maple, buds will grow on the trunks. Then, if trees are cut down or blown over, buds will grow on the stumps or from the roots.

Thus, we can see by watching the formation and development of buds, and the growth of branches, that trees follow certain fixed laws of nature, modifying these laws only on account of some peculiar external conditions as, for example, nourishment, light, heat or moisture.

Roberta Irvine Brotherson.

THE CHAMBERED NAUTILUS.

This is the ship of pearl, which, poets feign,
Sails the unshadowed main,
The venturous bark that flings
On the sweet summer wind its purpled wings
In gulfs enchanted, where the Siren sings,
And coral reefs lie bare,
Where the cold sea maids rise to sun their streaming hair.

Its webs of living gauze no more unfurl!
Wrecked is the ship of pearl!
And every chambered cell,
Where its dim dreaming life was wont to dwell,
As the frail tenant shaped his growing shell,
Before thee lies revealed,—
Its irised ceiling rent, its sunless crypt unsealed!

Year after year beheld the silent toil
That spread his lustrous coil;
Still, as the spiral grew,
He left the past year's dwelling for the new,
Stole with soft step his shining archway through,
Built up its idle door,
Stretched in his last-found home, and knew the old no more.

Thanks for the heavenly message brought by thee,
Child of the wandering sea,
Cast from her lap, forlorn!
From thy dead lips a clearer note is born,
Than ever Triton blew from wreathed horn!
While on mine ear it rings,
Through the deep caves of thought I hear a voice that sings:

Build thee more stately mansions, O my soul,
As the swift seasons roll!
Leave thy low-vaulted past!
Let each new temple, nobler than the last,
Shut thee from heaven with a dome more vast,
Till thou at length art free,
Leaving thine outgrown shell by life's unresting sea!

Oliver Wendell Holmes.

THE NAUTILUS AND OTHER CEPHALOPODS.

The highest group of mollusks belongs to the class Cephalopoda, which signifies head-footed, the name being given to them because the head is surrounded by a circle of eight or ten arms, which act both as arms and feet. Let us take as an example of this class the common squid of the Atlantic coast (*Ommastrephes illecebrosa*), and see how it is formed. The body is long and cylindrical and ends at the tail in a point; the dorsal side of the tail end has a pair of triangular fins. The body is practically a hollow cylinder or sac which contains the vital organs of the animal. The neck is in many genera fastened to this cylinder or mantle by an apparatus which may be likened to a button and button-hole. The head is rounded, has on either side the large, round eyes, and at the end it is split up into ten arms, two of which are longer than the others and are called the tentacular arms. On the inner side, the arms are provided with two rows of suckers, which are little, rounded cups placed on pedicels or stems and which form a vacuum when they touch an object and so cling to it. The two long arms are expanded and club-shaped at the end, each club being armed with four rows of suckers. Directly in the center of the circle of arms the mouth is placed and is provided with two sharp beaks like those of a parrot, only inverted. In addition to these organs there is a large siphon or tube on the ventral side, which is really an organ of locomotion, for it expels water from the mantle cavity with great force, thus rapidly sending the animal backward, its usual direction of propulsion. The body has no shell for protection, but in its place there is a long rod called a pen, which acts as a backbone to support the body of the animal, although of course not in the same sense as the backbone of vertebrated animals. In some cephalopods this pen is hard and stiff but in *Ommastrephes* it is thin and soft. Such is the general form of a cephalopod, familiar names of which are the

Octopus, Squid, Nautilus, Paper-nautilus and Devil-fish. In this class, also, the majority of the shelled species are extinct, only a few living at the present time. The Ammonite is an example of the extinct cephalopods.

The most familiar member of this class to the layman is the Pearly Nautilus, the shell of which may be found on the mantle shelf or what-not of very many dwellings. The shell of the Nautilus is formed in a spiral and is made up of many chambers, all connected by a tube called a siphuncle, the outer chamber containing the animal and hence called the living chamber. The shell is called the "Pearly Nautilus," but the pearly tints cannot be seen until the outer layer—which is yellowish-white with brown markings—is taken off, when the exquisite, rainbow-like colors may be observed.

While the shell of Nautilus is well known the animal is very rare in our museums, although the natives of the Fiji Islands, New Hebrides and New Caledonia are able to obtain it in large quantities for food and it is highly esteemed by them. During the voyage of H. M. S. Challenger around the world, a living Nautilus was captured by dredging in some three hundred and twenty fathoms near Mateeka Island, one of the Fiji group. This was placed in a tub and it swam about in a lively manner by ejecting water from its funnel. The tentacles, of which there are a larger number than in the other cephalopods, were spread out radially, like those of the sea anemone. The Nautilus lives among the coral reefs, at depths varying from three to three hundred fathoms or more.

The Fijian's method of capturing the Nautilus for food is thus described (Tryon,—*Structural and Systematic Conchology*): "When the water is smooth so that the bottom, at several fathoms' depth, near the border of the reef, may be distinctly seen, the fisherman in his little, frail canoe scrutinizes the sands and the coral

LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO



masses below, to discover the animal in its favorite haunts. The experienced eye of the native may probably encounter it in its usual position, clinging to some prominent ledge, with the shell turned downwards. The tackle consists first, of a large, round, wicker-work basket, shaped very much like a cage rat-trap, having an opening above, with a circlet of points directed inward, so as to permit of entry but to preclude escape; secondly, a rough piece of rope of sufficient length to reach the bottom; and lastly, a small piece of branched wood, with the branches sharpened to form a sort of grapnel, to which a perforated stone is attached, answering the purpose of a sinker. The basket is now weighted with stones, well baited with boiled cray-fish (the principal food of the Nautilus is crabs of different species), and then dropped gently down near the victim. The trap is now either closely watched or a mark is placed upon the spot, and the fisherman pursues his avocation upon other parts of the reef until a certain period has elapsed, when he returns and in all probability finds the Nautilus in his cage, feeding upon the bait. The grapnel is now carefully let down, and having entered the basket through the opening on top, a dextrous movement of the hand fixes one or more of the points or hooks and the prize is safely hoisted into the canoe."

The animal is made into soup by some of the natives while others boil it in a pot. The shells are used by the natives to make beautifully carved figures, the contrast of the dark outer coating against the light, pearly, inner coating producing a striking effect. The shell is also used in England and on the Continent to produce elegant cameos.

The Argonaut," or "Paper Sailor," is no less beautiful and interesting than the Pearly Nautilus. The thin and fragile shell cannot be compared with that of the Nautilus nor with the pen, or internal support, of the squid, for it is attached to the animal by no muscles, and is only kept in position by the broad webs on the upper arms of the female (which alone possesses a shell), its function being simply to protect the eggs. The male is very much smaller than the female and is ex-

ceedingly rare. The natural position of the female is with its arms spread out and hanging about the shell, four in front and four behind, the two broad arms supporting the shell being spread out and closely embracing the latter. The siphon is turned toward the ridged part of the shell and the animal progresses in a backward direction by forcibly ejecting water through this organ. It crawls with the shell on its back, like a snail.

The poets have given us many beautiful writings detailing the vices and virtues of the lower forms of life and among these the Pearly Nautilus and Paper Sailor have received a goodly share of the muse's attention. But, alas! for the poet, who, not being a conchologist, has sadly misused and misjudged these helpless and harmless creatures. Thus we are told how the paper nautilus sails over the ocean with his "sails" (meaning the two expanded arms) spread out to catch the breeze, and how, when the storm approaches, it folds its sails and disappears beneath the waters of the ocean. Alas for the poet! he puts the most beautiful ideas together in verse, ideas and themes which we would fain believe; but along comes cold, calculating science, and at one fell stroke sweeps away all that the poet has done, for in the poem on the Argonaut all is wrong, the animal does not and could not sail, for were it to do so the shell would fall and become lost in the bottom of the ocean.

A mollusk whose shell is cast upon the shore by thousands, but the animal of which is very rare, is the Spirula. The shell is less than an inch in diameter, is made in the form of a loose spiral and is divided into little chambers connected by a siphuncle. The shell of this genus does not contain the animal, as in Nautilus, but it is enveloped in two flaps of the mantle, at the posterior part of the animal, the shell being concealed with the exception of a part of the edge on each side. The body of the animal is long and cylindrical and the arms are quite short, more nearly resembling those of the Nautilus than those of the Octopus or squid. The body ends in a disk which is supposed to be a kind of sucker, by which the animal can adhere to rocks, thus enabling it to freely use its arms in obtaining food. It has

been supposed by some anatomists that the shells of the fossil Ammonites were attached to the animal in a similar manner, and if this should be true these small mollusks would assume a new meaning as being the last survivors of a large group of animals of which all except *Spirula* are extinct.

Probably the best known of the shell-less cephalopods is the octopus, with its rounded body, large eyes and long arms. Almost everybody has read Victor Hugo's weird account of the octopus in his "Toilers of the Sea," and the animal has thus been rendered more or less familiar, although it was made to do several things by the author that it would not do in nature, as, for example, "drinking" a man alive. The Octopus is found abundantly throughout temperate and tropical seas, generally on the coast among rocks, but frequently on the sandy bottom in water of moderate depth. Here it may occasionally be seen "walking" clumsily along on its eight long arms, its little round body being balanced above the arms. Its favorite position, however, is among the rocks. In such a locality it will squeeze its body into some crevice and spread out its arms until they form a sort of web, resembling in this position a huge spider waiting for its prey. And it may well be likened to a spider for from this web there is no escape if once a hapless fish has come in contact with the powerful suckers on the long arms. The poor fish is paralyzed when seized by the octopus and is drawn towards the mouth, where it is torn to pieces by the beak-like jaws, and swallowed.

Like many of the mollusks of which we have written the octopus is esteemed as a valuable article of food by several savage tribes as well as by some civilized people. The native of the Pacific coast catches the Octopus (*Octopus punctatus*) by a very ingenious method. Providing himself with a spear twelve or fourteen feet long which has four or five barbed pieces of hard wood some fourteen inches long attached to the end, he paddles his canoe to the feeding-ground of the mollusk. One is soon found in ten or twelve feet of water and the Indian carefully lets down his spear until within a few inches of the center of the animal, when he

quickly plunges it into the soft mass. Instantly the water is in commotion, the eight long arms writhing about in an endeavor to reach the boat. The Indian knows that should this happen his chances for life would be slim indeed. But he is prepared, and carefully lifting up the octopus with his barbed spear until it is above the surface of the water, he plunges a long, sharp spear, with which he is provided, into each arm where it joins the body. At each plunge of the spear, an arm becomes helpless and in a short time the animal, which but a few moments before had the power of a score of men, lies in the canoe, a shapeless, helpless mass.

That the octopus is good eating the writer can attest from experience, for during a visit to Yucatan some years ago this mollusk was served as a meat dish and was very palatable, the flesh being firm and tender and much resembling chicken. The portion which fell to the writer was the head, with a part of the arms attached.

One of the most interesting characteristics of the Octopi and allied cephalopods is their facility for changing color when danger is near. These changes are caused by little pigment cells just beneath the skin, which expand and contract. Thus, if a person is looking at an octopus in captivity and the animal is so placed that it cannot escape, the observer will be astonished to see the body of the animal suddenly assume a deep pinkish color which in turn is succeeded by a blue and then by a green, and finally a return to pink. The body is covered with these little pigment cells, the different colors—pink, blue and green—being so evenly scattered over the surface than when each color cell is expanded the whole body assumes that tinge. This is one of the most wonderful characteristics of the Mollusca.

Another cephalopod closely related to the Octopus is the Squid, several species of which are found on the Atlantic coast of the United States. In this genus the body is long and cylindrical, ends in two fins, has a prominent head terminating in eight short and two long arms and is supported by a long, cartilaginous, internal pen, which is made up of a central shaft with expansions on each side like a quill,

hence the name "pen." These animals are very numerous in individuals and form a large part of the food of fishes, like the blue-fish, black bass, etc., and have even been found in the stomach of jelly-fishes. Besides being eaten by the fish the squid furnishes a large part of the food of some whales, the former occurring frequently in shoals and falling ready victims to the huge monster.

In Norway and Sweden the people have a legend of a peculiar sea-monster, called the Kraken, which was probably founded on some of the enormous squids discovered during the past thirty years. Many of these mollusks are found off the coasts of Norway, Scotland and Ireland, and not a few have been recorded from the coasts of Nova Scotia and New England. In the larger of these animals the body is eight or ten feet long, the short arms eight feet and the long, tentacular arms thirty feet in length, making in all an animal nearly forty feet long when fully stretched out! The squid is greatly prized as bait and frequently a royal battle will take place between one of these gigantic creatures and a boat's crew. Sad indeed is the fate of the latter if the mollusk once gets a firm hold of the boat. Care is used, however, to guard against such a result, and the animal is gradually deprived of its strength by making a sudden dash, cutting off an arm and as quickly retreating. These large squids are not as common as the smaller ones and they are rarely captured.

An ingenious method of capturing a species of the smaller squids (*Ommastrephes illecebrosa*) in use by the fishermen of the New England coast is as follows: The squid has the habit of swimming in an opposite direction to a light, as the full moon, so the fishermen go out to sea

in boats, light a large torch in each boat and slowly row toward the shore, driving the squid, which of course swim backward in an opposite direction from the light, upon the beach, where they may be gathered by thousands after such an expedition. Another method of capture is by jigging; the jig is made of a piece of lead some two inches in length which is armed with a circle of sharp, unbarbed wires pointing upward and curving outward. The process of jigging is accomplished as follows: the jig is attached to twelve or fifteen feet of stout line and is lowered into the water, which is generally chosen of a depth of ten feet from the side of a small boat. When near the bottom it is kept moving slowly up and down until a squid is felt upon it, when it is suddenly drawn to the surface with the squid attached. These squid, when caught, are used for bait, a single fishing smack being known to use as many as eighty thousand squids in a single season.

A familiar object to most canary-bird fanciers is the cuttle-bone placed in the cages of these birds for them to sharpen their beaks upon. This "cuttle-bone" is the internal support of the Cuttle-fish (*Sepia officinalis*) and is homologous with the pen of the squid, mentioned above. The animal of *Sepia* is short and rounded, with a large head surrounded by a row of eight short arms and two very long tentacular arms, ending in expanded clubs armed with powerful suckers. Like the Octopus and Squid, the Cuttle-fish is capable of many changes of colors by the contraction and expansion of its pigment cells. They are found throughout the world, living near the shore, but the species found about European shores are the best known.

Frank Collins Baker.

God made all the creatures and gave them
Our love and our fear,
To give sign we and they are His children,
One family here.

—Robert Browning.

THE TRAILING ARBUTUS.

(*Epigaea repens.*)

Many years ago, before the Mayflower had cast anchor in Plymouth Bay or Columbus had landed at San Salvador, an aged indian sat shivering in his wigwam. Vainly had he sought for fuel and in his extremity he called upon the Great Spirit, that he might not perish with the cold. Crouching over the dying embers of his fire he stoically awaited the end, when suddenly there appeared before him a beautiful maiden wreathed with wild flowers and carrying in her hands, buds of the willow. Ferns and grasses draped her form and her moccasins were fashioned from pure white lilies. When she breathed the landscape suddenly blossomed with the thousand hues of nature and the warm rains fell in obedience to her will.

Under the influence of this spirit of the springtime the aged red man slumbered and, as his head sank upon his breast, the sunshine came out in all its splendor and a blue bird alighted upon the top of the wigwam. Slowly the maiden passed her hand above the old indian and gradually he shrank away until nothing remained but a cluster of green leaves. Then taking from her bosom a cluster of rosy blossoms, she concealed them among the leaves, bestowing upon them her own sweetness and fragrance and telling them that as the harbingers of spring, all who would inhale their fragrance, must bow the knee in honor of the vernal goddess. The maiden then passed away through the woods and over the prairies and wherever her footsteps lingered, there grows today the sweet-breathed mayflower.

Whether or not this fanciful story relates the real origin of the Trailing Arbutus, Ground Laurel or Mayflower, as it is variously called in different sections of the country, the fact remains

that it follows closely in the footsteps of spring, often pushing up its dainty blossoms through the leaves and snow. It is always known as the Mayflower throughout New England and the old story of its being Flora's first offering to the ocean-tossed pilgrims as they landed at Plymouth, in appreciation of which they named it the Mayflower in memory of their vessel, has endeared the beautiful plant to every New England heart and has caused it to be placed in Cupid's keeping, along with the Scotch blue bell, the German corn flower and the Swiss edelweiss.

The Trailing Arbutus (*Epigaea repens*) belongs to the Heath family or Ericaceæ and constitutes the only species of the genus. Like the partridge berry which is often associated with it in pine woods and sandy soils, it is still in a state of transition, although it has been developing for centuries. As a rule, plants have the stamens and pistils in the same blossom or part in one and part in another. The Mayflower, however, does not carry out this arrangement. Either the anthers or the stigmas are abortive or partially so, or in other words, the perfect stigmas are usually associated with abortive anthers and vice versa. In this manner, nature has wisely provided for cross fertilization which is accomplished largely by insects, as the structure of the plant is not adapted to wind fertilization. The chosen agents for this process are honey bees, and a few early moths and butterflies, to which the nectar is served by this beautiful Hebe of the spring and who carry the pollen from one flower to another.

A wise provision of nature has been pointed out whereby ants are kept away from the nectar which they would devour without accomplishing the purposes for which it was created. Every



TRAILING ARBUTUS OR MAYFLOWER.
(*Epigaea repens*).
FROM "NATURE'S GARDEN"
FOUNDED 1905 BY
D. J. DUBLEDAY, PAGE & COMPANY.



MOUNTAIN LAUREL OR CALICO-BUSH.
(*Kalmia latifolia*).

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

rocky hillside on which the Trailing Arbutus is frequently found, swarms with ants which are debarred from the blossoms by hairs which project upward from the inner surfaces of the corolla and the outer surfaces of the ovary and style and effectually prevent the ants from entering but are not sufficiently rigid to keep out the larger insects.

As a rule, the pollen bearing flowers are larger and whiter than the others. The stigma bearing blossoms, while small, more than offset their defect by a rosy color which makes the flowers far more attractive than their larger but paler rivals.

Very little success has been achieved in domesticating the Trailing Arbutus. It is essentially a wild creature and prefers to waste its fragrance on the desert air. Success may be had, however, if the conditions under which the plants are found growing are preserved as nearly as possible. Yearling plants should be selected and plenty of roots taken or results can be obtained from planting seeds, but as these are difficult to obtain, the other method is the more satisfactory.

Charles S. Raddin.

TRAILING ARBUTUS.

Ah, quite alone these April days
It blossoms to evoke my praise;
And hyacinthine scents are shed
To bless and cheer me, hither led.

Upon this sheltered, upland knoll,
At early dawn I often stroll;
White clusters edged with crimson hue
Lie here, impearled with crystal dew.

The leaves, like memories, evergreen,
The blooms, like truth, of purest sheen;
The cup within, like some fair breast
Where holy thoughts can surely rest.

How worthy of its meek renown!
Delightful gem for beauty's crown.
O'er it with joy can poet brood;
It breathes of God in solitude.

—George Bancroft Griffith.

THE MOUNTAIN LAUREL.

(*Kalmia latifolia*.)

About the middle of the eighteenth century an enthusiastic botanist and collector, Peter Kalm, gathered specimens in America of a beautiful plant which he carried back to the gardens of Europe and also to his preceptor, the naturalist Linnaeus. In the year 1753 Linnaeus named the plant, honoring his pupil by giving to the plant the generic name *Kalmia*. He also gave it the specific name *latifolia*, referring to its broad leaves.

The genus *Kalmia* includes six known species, five of which are natives of eastern North America and one a native of Cuba. They are all beautiful shrubs, varying in height from a few inches to several feet.

The plant of our illustration is a native of the eastern portion of the United States, where it grows in sandy or rocky woods and is more abundant in mountainous regions. This shrub, which grows to a maximum height of twenty feet, is a superb object early in June, when it is covered with corymbs of rather large pink or pinkish-white flowers and numerous evergreen leaves.

Easily cultivated and highly ornamental, it has been introduced into the greenhouses and gardens of this and European countries.

In spite of the beauty of this plant, it has a bad reputation, for its leaves are narcotic and poisonous to some animals. "Even the intelligent grouse, hard pressed with hunger when deep snow covers much of their chosen food, are sometimes found dead and their crops distended by these leaves."

We cannot show the characteristics of this plant in any better way than to quote from "Nature's Garden," where we find the following passage:

"All the *Kalmias* resort to a most ingenious device for compelling insect visitors to carry their pollen from blossom to blossom. A newly opened flower has its stigma erected where the incoming bee must leave on its sticky surface the four minute orange-like grains carried from the anther of another flower on the hairy underside of her body. Now, each anther is tucked away in one of the ten little pockets of the saucer-shaped blossom and the elastic filaments are strained upward like a bow. After hovering above the nectary, the bee has only to descend towards it, when her leg, touching against one of the hair-triggers of the spring trap, pop! goes the little anther-gun, discharging pollen from its bores as it flies upward. So delicately is the mechanism adjusted, the slightest jar or rough handling releases the anthers; but, on the other hand, should insects be excluded by a net stretched over the plant, the flowers will fall off and wither without firing off their pollen-charged guns. At least this is true in the great majority of tests. As in the case of hot-house flowers, no fertile seed is set when nets keep away the laurel's benefactors."

Many of our readers reside near the home of the Mountain Laurel and can examine the interesting features of this beautiful plant in Nature's own garden. Those that do this will be well repaid.

Violets stir and arbutus waits,
Claytonia's rosy bells unfold;
Dandelion through the meadow makes
A royal road, with seals of gold.

—Helen Hunt Jackson.

UNIVERSITY OF ILLINOIS
URBANA



HOPS.

(*Humulus lupulus* L.)

"A land of hops and poppy-mingled fields."

—Tennyson: *Aylmer's Field*.

The hop plant is a creeping perennial with several stems or branches attaining a length of fifteen to twenty-five feet. It has numerous opposite three to five lobed, palmately veined, coarsely toothed leaves with long leaf stalks (petioles). Flowers unisexual, that is staminate and pistillate flowers separate, either on separate plants (dioecious) or upon different branches of the same plant (monoecious). Flowers insignificant in loose, drooping axillary panicles. Fruit a cone-like catkin usually designated a strobile.

The hop has been called the northern vine. It is found in a wild state throughout Europe, excepting the extreme north, and extends east to the Caucasus and through central Asia. It is a handsome plant and not infrequently used as an arbor plant. The lower or basal leaves are very large, gradually decreasing in size toward the apex. *H. lupulus* is the only representative of the genus.

It is rather remarkable that a plant so widely distributed and familiar should not have been known to the Greeks and Romans. Its cultivation in Europe dates back to the eighth and ninth centuries. It was, however, not extensively cultivated until about the sixteenth and seventeenth centuries.

The word hop (German, Hopfen) is of very uncertain origin. According to some authorities it is traceable to the old English, *hoppan*, in reference to the habit of the plant in climbing over hedges and fences. *Humulus* is said to refer to its habit of creeping over the soil. *Lupulus* (diminutive of *lupus*, wolf) is said to refer to the pernicious and destructive influence the hop plant has upon plants which it uses as a support, especially the willows. Plinius named it *Lupus salic-*

tarius, that is, the willow wolf or willow destroyer.

Beside the countries above named hops is also cultivated in Brazil and other South American countries, Australia and India. There are several cultivated varieties. According to most authorities it is not supposed to be indigenous to North America, but Millspaugh expresses it as his opinion that it is indigenous northward and westward, growing in alluvial soil, blossoming in July and fruiting in September.

The plants are planted in rows and the rapidly growing branches trained upon poles stuck into the soil. Three or four male plants (with staminate flowers) are grown in an acre patch to supply the necessary pollen. Some authorities state, however, that the female plants develop enough staminate flowers to effect pollination. It is extensively cultivated in England, Germany and France. Also in New England, New York, Michigan, and in fact nearly every State in the Union.

In Belgium the young, tender tops of the plants are cut off in the spring and eaten like asparagus, especially recommended to the pale and anaemic and those with scrofulous taints.

The peculiar hop-like fruiting known as strobiles are collected in the fall of the year (September to October), dried and tightly packed into bales. The base of the scales of the strobile are covered with a yellowish powder, consisting of resin-bearing glands, known as lupulin. One pound of hops yields about one ounce of lupulin. Since the medicinal virtues of hops reside in the lupulin it will be readily understood that the hops from which the glands have been removed is of little or no medicinal value. Lupulin as well as

the hops have a faint, peculiar, somewhat yeasty odor, which increases with age due to the development of valerianic acid. For medicinal purposes only fresh hops should be used.

The principal use of hops is in the manufacture of beer, to which it imparts the peculiarly bitter taste, and its repute as a tonic. For this purpose enormous quantities are consumed in Germany and England. The exhausted hops from the breweries form an excellent fertilizer for light soils. The leaves have been used as fodder for cows. Leaves, stems and roots possess astringent properties and have been used in tanning. In Sweden the fibre of the stems is used in manufacturing a very durable white cloth, not unlike the cloth made from hemp and flax.

Hops is used medicinally. It at first causes a very slight excitation of brain and heart, followed by a rather pronounced disposition to sleep. Pillows stuffed with hops form a very popular domestic remedy for wakefulness. Hop bags dipped in hot water form a very soothing external application in painful inflammatory conditions, especially of the

abdominal organs. It has undoubted value as a bitter tonic in dyspepsia and in undue cerebral excitation. Tincture of lupulin and red pepper (*capsicum*) enjoys the reputation of being a very efficient substitute for alcoholic stimulants when their use is to be discontinued. Earlier physicians recommended hops very highly in kidney and liver complaints, as a "blood purifier" and to cure eruptive skin troubles. It is recommended in nervous troubles and in delirium tremens. The roots were formerly employed as a substitute for sarsaparilla.

Hops contains an etherial oil, resin and tannic acid. The oil and the resin are important constituents in the manufacture of beer. The young shoots contain asparagin, etherial oil, resin and sugar.

Description of Plate.—A, staminate (male) inflorescence; B, pistillate (female) inflorescence; C, fruiting branch; 1, staminate flower; 2, perigone; 3, stamen; 4, open anther; 5, pollen; 6, pistillate catkin; 7, 8, 9, pistillate flowers; 10, scales; 11, 12, 13, scales and flowers; 14, 15, fruit; 16, 17, 19, seed; 20, resin gland (lupulin).
Albert Schneider.

AWAKENING.

Never yet was a springtime,
Late though lingered the snow,
That the sap stirred not at the whisper
Of the south wind sweet and low;
Never yet was a springtime
When the buds forgot to blow.

—Margaret E. Sangster.

BIRDS and NATURE

IN NATURAL COLORS

A MONTHLY SERIAL

FORTY ILLUSTRATIONS BY COLOR PHOTOGRAPHY

A GUIDE IN THE STUDY OF NATURE

TWO VOLUMES EACH YEAR

VOLUME X

JUNE, 1901, TO DECEMBER, 1901

EDITED BY WILLIAM KERR HIGLEY

CHICAGO

A. W. MUMFORD, PUBLISHER

203 Michigan Ave.

1901

COPYRIGHT 1901 BY
A. W. MUMFORD

BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. X.

JUNE, 1901.

No. 1

JUNE.

No price is set on the lavish summer;
June may be had by the poorest comer.

And what is so rare as a day in June?
Then, if ever, come perfect days;
Then Heaven tries the earth if it be in tune,
And over it softly her warm ear lays:
Whether we look, or whether we listen,
We hear life murmur, or see it glisten;
Every clod feels a stir of might,
An instinct within it that reaches and towers,
And, groping blindly above it for light,
Climbs to a soul in grass and flowers;
The flush of life may well be seen
Thrilling back over hills and valleys;
The cowslip startles in meadows green,
The buttercup catches the sun in its chalice,
And there's never a leaf nor a blade too mean
To be some happy creature's palace;
The little bird sits at his door in the sun,
Atitl like a blossom among the leaves,
And lets his illumined being o'errun
With the deluge of summer it receives;
His mate feels the eggs beneath her wings,
And the heart in her dumb breast flutters and sings;
He sings to the wide world, and she to her nest,—
In the nice ear of Nature which song is the best?

—James Russell Lowell, "The Vision of Sir Launfal."

BULLOCK'S ORIOLE.

(*Icterus bullocki.*)

Bullock's Oriole, a species as handsome and conspicuous as the Baltimore Oriole, replaces it in the western portions of the United States and is likewise widely distributed. Its breeding range within our borders corresponds to its distribution. It is only a summer resident with us, arriving usually from its winter haunts in Mexico during the last half of March and, moving slowly northward, reaches the more northern parts of its breeding range from a month to six weeks later. It appears to be much rarer in the immediate vicinity of the seacoast than in the Great Basin regions, where it is common nearly everywhere, especially if sufficient water is found to support a few stunted cottonwoods and willows. During my extensive wanderings through nearly all the states west of the Rocky Mountains and extending from the Mexican to the British borders, I have met with this species almost everywhere in the lowlands and in some localities have found it very abundant. Like the Baltimore Oriole, it avoids densely wooded regions and the higher mountains. It is especially abundant in the rolling prairie country traversed here and there by small streams having their sources in some of the many minor mountain ranges which are such prominent features of the landscape in portions of Idaho, Washington and Oregon. These streams are fringed with groves of cottonwood, mixed with birch, willow and alder bushes, which are the favorite resorts of this Oriole during the breeding season. The immediate vicinity of water is, however, not considered absolutely necessary, as I have found it nesting fully a mile or more away from it on hillsides, the edges of table-lands and in isolated trees, or even in bushes. In Colorado it is said to be found at altitudes of over eight thousand feet, but as a rule it prefers much lower elevations.

The call notes of Bullock's Oriole are very similar to those of the Baltimore, but its song is neither as pleasing to the ear nor as clear and melodious as that of the latter. Its food is similar and consists principally of insects and a few wild berries.

The nest resembles that of the Baltimore Oriole, but as a rule it is not quite as pensile and many are more or less securely fastened by the sides as well as by the rim to some of the adjoining twigs. The general make-up is similar. As many of the sections where Bullock's Oriole breeds are still rather sparsely settled, less twine and such other material as may be picked up about human habitations enter into its composition. Shreds of wild flax and other fiber-bearing plants and the inner bark of the juniper and willow are more extensively utilized; these with horsehair and the down of plants, wool and fine moss furnish the inner lining of the nests. According to my observations, the birch, alder, cottonwood, eucalyptus, willow, sycamore, oak, pine and juniper furnish the favorite nesting sites; and in Southern Arizona and Western Texas it builds frequently in bunches of mistletoe growing on cottonwood and mesquite trees.

The nests are usually placed in low situation, from six to fifteen feet from the ground, but occasionally one is found fully fifty feet up. A very handsome nest, now before me, is placed among six twigs of mistletoe, several of these being incorporated in the sides of the nest, which is woven entirely of horsehair and white cotton thread, making a very pretty combination. The bottom of the nest is lined with wool.

The sexes are extremely devoted to each other and valiantly defend their eggs and young. I once saw a pair vigorously attack a Richardson's squirrel, which evi-



BULLOCK'S ORIOLE.
(*Icterus bullocki*).
 $\frac{3}{4}$ Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

dently was intent on mischief, and drive it out of the tree in which they had their nest. Both birds acted with the greatest courage and dashed at it repeatedly with fury, the squirrel beating a hasty retreat from the combined attack. The young are large enough to leave the nest in about

two weeks and are diligently guarded and cared for by both parents until able to provide for themselves.

CHARLES BENDIRE.

From "Life Histories of North American Birds."

AN AFTERNOON IN THE CORNFIELD.

Uncle Philip was 16 years old, tall and strong, with merry dark eyes, red cheeks and thick, soft, wavy, brown hair. Every day except Saturday he was in school. Sometimes on Saturdays he went in the woods botanizing or he rowed his pretty boat, "The Lorelei," upon the lake. But often he went to his sister's, Mamma Bryant's, to spend the day and work upon the farm. His little nephew, Leicester, was always glad when he came, for Uncle Philip took him with him to the field or barn, told him funny stories and taught him to take notice of all the things he saw or heard. One beautiful day in October, after the corn had been all cut and was standing in big yellow stooks, making long rows through the stubble, Uncle Philip arrived early in the morning at Leicester's home. Leicester was still in bed when Uncle Philip came, and Mamma Bryant said to herself, "I must go and see if he is awake." But just as she was about to open the door, out came Leicester in his white pajamas, rubbing his eyes and looking a little bit sleepy.

"Come, Leicester," said his mamma, "I will help you dress and then you can have your breakfast. Uncle Philip has been here and he has gone to the cornfield south of the meadow. He hitched up Blotter and Little Gray on the new wagon and will drive back to dinner. Come with me and get ready for breakfast. After breakfast I want you to take little sister Keren with you and hunt for the eggs.

If you are a good, pleasant boy this morning you may go this afternoon with uncle, and I will make some cookies for you to take in your lunch basket."

Leicester, who was generally a very good boy, promised to do as his mother desired.

Before dinner time Aunt Dorothy came, and it was decided that she, too, should go to the cornfield and take Keren with her.

By one o'clock dinner was over. Mamma Bryant had decided that Leicester's lunch basket was too small, so she had taken a peach basket, into which she put, among other good things to eat, some large red apples and ever so many fresh baked cookies.

Uncle Philip had driven up the roadway and was standing in the new wagon waiting for his passengers. Corn huskers never take a seat on their wagons, but Uncle Philip had laid a board across the wagon-box and on that Aunt Dorothy seated herself.

It was a warm, bright day and the wagon ride to the cornfield was delightful. Blotter and Little Gray were not a very handsome team, but they were good gentle horses and the children loved them. Blotter was a white horse with black spots on him, which made him look as if he had been used for a pen-wiper.

On the way to the cornfield a little rabbit ran out of the bushes by the roadside, but quickly hid himself again. The chipmunks stood on their hind feet in

the tall, withered grass and watched the new wagon coming down the road and popped into their holes when they thought it had come too near. The plumy pappus of the golden rod, with great bunches of scarlet rose seeds, bursting pods of the satin plant and clusters of large red and chocolate oak leaves growing on year-old sprouts which had sprung up from the stumps of trees cut down the fall before made huge bouquets in the fence corners. While driving through the meadow the horses, which were pastured there, came up to neigh a good-day to their friends in the harness and trotted along for some time on both sides of the wagon and behind it. At last the cornfield was reached and Uncle Philip drove up to a corn stook.

"Look at that bird sitting on the wire fence," said Aunt Dorothy. "Isn't that a butcher bird?"

"Yes," said Uncle Philip, "that is a shrike, or butcher bird. I should not wonder if it were the same bird that followed me around this morning. I won't tell you what he did, but if you will watch him maybe you'll see something very interesting yourself."

Uncle Philip put on his husking gloves and began his work, taking the ears of corn from the stalks in the stook without disturbing it any more than he could help.

Aunt Dorothy remained sitting on her board in the wagon.

Leicester and Keren went to play in the meadow through which they had just driven, and they frightened the butcher bird so that he flew away from the fence and perched near the top of a tall cornstalk in a neighboring stook. Keren found a dandelion blossom and Leicester a wild rose, a bit of pale, pink beauty that had blossomed late and alone on a bush whose leaves were dusty and faded. The children went to a hickory tree expecting to find some nuts on the ground, but the squirrels had been there already and nothing was left except some nut-shells. Yes, there were three or four nuts, but when, by the aid of two stones, the children had cracked them, they found the meat inside all dried up and unfit to eat. The squirrels must have known this without cracking the nuts,

otherwise they would not have left them as they did.

Aunt Dorothy and Uncle Philip were talking about the butcher bird.

"The butcher bird is found all over the world," said Aunt Dorothy, "and has different names in different countries."

"And it has been written about by men who lived a long, long time ago," said Uncle Philip, and he told Aunt Dorothy some of those men's names. But they are so long and hard to say I will not tell them here.

"The shrike is a cousin to the crow. Nearly all the crows have black feathers, but the butcher bird wears a different dress in France from the one he wears in England, and in India he has still another garb," said Aunt Dorothy.

"Yes," said Uncle Philip, "but all the shrikes everywhere have toothed bills."

By this time two more shrikes or butcher birds had joined the first one and all three were flying about impatiently from place to place.

"Just as if they were waiting for something to happen," said Aunt Dorothy.

"So they are," said Uncle Philip, who had finished husking the corn in his stook. "Call the children now; or I will," he said, and whistled and beckoned till Leicester and Keren came running to where he was.

"Now," he said, "look at that stunted old tree over there, children. Do you see the three butcher birds in it?"

Yes, every one saw the birds.

"Well, then," he said, "get into the wagon and keep watch of them. I am going to drive to the next corn stook," and away they went. After Uncle Philip had stopped the horses he told Aunt Dorothy and the children to sit together on the board with their backs to the horses and keep very still.

"I am going behind the corn stook and will pull it away as best I can from where it now stands. Watch the birds and the ground near the stook."

As soon as he had pulled away the cornstalks he stooped down and walked away some distance as quickly and quietly as he could. Then Aunt Dorothy and the children saw the butcher birds alight on the ground on which the cornstalks had been and catch young mice

and moles. One of the birds took a mole to the wire fence near by and stuck it on a barb. Then he flew away, leaving it hanging there. He was going to catch some young mice to eat just then and save the mole for luncheon.

His claws were not strong enough to hold the mole while he could kill and eat it, but if he hung it on the wire fence he could use all his strength in tearing it to pieces with his strong toothed bill. Every one felt sorry for the poor mole, but all were glad to be able to see how the butcher bird gets his dinner.

Time went by and soon Uncle Philip was ready to move another bunch of cornstalks. Aunt Dorothy and the children prepared to watch again, for the butcher birds were still in the neighborhood and waiting anxiously for a chance to secure some more prey. This time there was a rat under the cornstalks and a bold butcher bird flew at him and tried to kill him. The rat, however, got away from his enemy in feathers. One of the butcher birds caught a mole and stuck it on a long thorn on a hawthorn tree.

"Let us have something to eat as well as the birds," said Uncle Philip. So he

left Blotter and Little Gray standing in the field—they were never known to run away—and all went to a pleasant spot in the meadow and ate the luncheon which Mama Bryant had sent in the peach basket. Oh, how good those cookies tasted to Leicester and Keren!

Those were happy passengers who rode home that evening on the yellow ears of corn. Keren had found one red ear and she took it home and gave it a place by the side of her pet playthings.

At supper time Leicester told his papa what they had seen the butcher birds do, and Aunt Dorothy said: "You must tell about it in school, Leicester; it will make a good Monday morning story."

That evening after Uncle Philip and Aunt Dorothy had gone home and the children had said their little evening prayer Leicester kissed his mother and told her he would try to be a good boy every day for a whole week. "And I hope I will have as good a time next Saturday as I have had to-day," said he.

And all night long the little stars peeping through the windows saw two happy little faces asleep upon their pillows.

MARY GRANT O'SHERIDAN.

THE RETURN OF THE BIRDS.

I hear from many a little throat
A warble interrupted long;
I hear the robin's flute-like note,
The bluebird's slenderer song.

Brown meadows and the russet hill,
Not yet the haunt of grazing herds,
And thickets by the glimmering rill
Are all alive with birds.

—William Cullen Bryant.

HOUSE-HUNTING IN ORCHARD TOWN.

'Tis up and down
In Orchard town,
When airs with bloom are scented,
You'll hardly find
To suit your mind
A nook that is not rented.

The old sweet-bough,
They all allow,
The robin first selected.
"Our home is here,
Good cheer, good cheer,
All other claims rejected."

"Chick-a-dee-dee,
Don't come to me!"
The titmouse is refusing,
"We've leased this tree,
We'll friendly be,
But say you're late in choosing."

"Sweet, sweet, sweet, sweet,"
Across the street
The yellow-birds are moving.
"Chip-chip-a-chee;
So dear is she!"
He scarce can work for loving.

On lower floor,*
Beside her door,
The wren is surely scolding.
If one but glance
She cries, "No chance
To rent the flat I'm holding."

For handed down
In Orchard town,
'Tis quite an ancient notion,
To wake the earth
With song and mirth,
Such joy is their devotion.

To hear her scold,
The sparrow bold
And jay, beside her dwelling,
Cry, "Tschip, tschip, chee!"
"Tease! tease! say we!"
The noise and chatter swelling.

On orchard wall,
To quip and call,
A stranger gay is listening;
His mate can hear
In meadow near,
Where daisy-birds are glistening.

Oh, Lady-link!
Ho, ho! just think!
To nest in trees what folly,
When they might be,
Like you and me,
In Daisy-land so jolly!

Down Pipin-way
Where branches sway,
An oriole hammock swings.
Mistress starling
And kingbird's darling.
Rest near with brooding wings.

If you should go
Down Blossom-row,
Which runs right through the center,
At each day,
In morning gray,
You'd hear from every renter.

—Isabel Goodhue.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



SANDERLING.
(*Calidris arenaria*).
 $\frac{2}{3}$ Life-size.

COPYRIGHT 1931, BY
A. W. MUMFORD, CHICAGO.

THE SANDERLING.

(*Calidris arenaria*.)

By the beach border, where the breeze
Comes freighted from the briny seas,
By sandy bar and weedy rock
I frequent meet thy roving flock;
Now hovering o'er the bending sedge,
Nor gather'd at the ocean edge;
Probing the sand for shrimps and shells,
Or worms marine in hidden cells.

—Isaac McClellan.

This little shore or beach bird is sometimes called the White or Surf Snipe, and the Ruddy Plover. It breeds only in the colder portions of the northern hemisphere and migrates southward, even beyond the equator where it makes its home during the winter months. It frequents chiefly those regions near the surf-beaten shores of the oceans. It is also a common visitor to the beaches of larger inland waters. On these shores its beautiful form and habits are very noticeable. It walks and runs in a dignified and graceful manner as it chases the receding water searching for its food.

The pure white of the plumage of the under parts of the bird is a striking characteristic as they reflect the sunlight during flight. It is a silent bird and it sometimes appears alone, though it is usually seen in flocks and is frequently associated with other species of the snipe family. Regarding its habits, some one has said: "When feeding along the extreme verge of the ocean it is pleasant to watch its active movements when advancing or retreating with the influx of the sea. It is naturally very unwary and regards man with less suspicion than most of our snipes. When a flock is fired into, those which survive rise with a low whistling note, perform a few evolutions and presently resume their occupation with as much confidence as previously exhibited."

The feet of the Sanderling are unlike the other members of its family, being without a fourth toe, entirely divided and

without a membrane. This indicates that it frequents firm surfaces and that it is fitted for running and walking upon the long, shelving beaches over which the tides and surf roll, leaving an abundance of its particular food.

The nest of the Sanderling, rudely constructed of dried grass and decayed leaves, is placed in a depression in the ground so situated as to be protected by the natural vegetation of the region. The eggs, usually three or four in number, have an ashy or greenish brown ground color and are finely spotted with different shades of brown.

The food of the Sanderling consists mainly of sea worms, small bivalve shells and crustaceans, though it will also eat buds and insects. It would seem as if its hunger was never satiated—always busy, always moving. These expressions describe its habits, as with its fellows and the other snipes with which it associates, it seeks its food in the wake of the retreating wave and turning, runs before the incoming water which seldom engulfs it.

For those who are so fortunate as to be located near the feeding grounds there can be no more interesting recreation than to sit on the beach and watch the peculiar antics of these delicate creatures. Frequently, without an apparent reason an entire flock will rise as if in answer to a signal and, after executing a few turns alight, and again resume the occupation it had left.

PARTNERS.

No doubt every one knows the Lichens, the greenish gray growths, sometimes like rosettes or clusters of leaves or of fruit, on tree trunks or the gray rocks by the water, and even on the ground and old wood. Their forms are various and often graceful, and mingled with their greenish gray are many brighter colors, giving a rich tone to the rough surfaces they cover and adorn. But I dare say that most of us have thought of a Lichen as a single plant. It is not so, though it looks so exactly like one in its close union. It is a partnership, indeed; generally what looks like a single Lichen is a colony of partners keeping house together, or a manufacturing firm, if you like that expression of their business better. The partners are also kindred, or were so, in the past.

For there was a time long ago when there was only one big family of plants, the Algae; the brown Algae or seaweeds known as kelps often form the "wrack" or tangle of weeds like long leaves or branching stems, with berry or fruit-like bladders, thrown on the coast in great masses by a storm; and the red Algae, or the beautiful fern-like and coral-like seaweeds that grow far down in the deep sea. There are also the green Algae, found in fresh water, or even on damp tree trunks and rocks. They have many odd forms. One kind, called a pond scum, is a frothy, slippery mass of spirally wound bands, floating in ponds or still water; another, called "green felt," is found in water also, and has egg-like things from which spores or seed-like bodies escape to form new plants. They have filaments at the bottom, like roots, that are called "holdfasts." Lastly, there are blue-green Algae, jelly-like masses found on trees, rocks, damp earth or floating as green slimes in fresh water. Most water plants are active and independent. They are on the upward road, for though they have not distinct stems,

roots, leaves or fruit, their different parts, as I have already said, show a decided likeness to these, especially their "holdfasts" to roots and their air-bladders to fruit. The exquisite red seaweeds are as graceful in form and vivid in color as many flowers.

There is a remarkable foreshadowing of the moral law even among these early growths. Some have shirked their work, which was to absorb waste substances, and manufacture these into organized plant food. They tried to live on other growths, to the injury of the latter, and even sank to feeding on dead substances. They lost the green chlorophyll, which is necessary for manufacturing, though the red and brown Algae do not show its presence because their other coloring is more vivid. But it is present all the same with every busy, self-respecting plant. The lazy, pauper growths deteriorated more and more and at last were no longer Algae at all, but Fungi. They could not live by themselves; their only chance was to get active or well-stocked partners. As the Alga developed more and more into a likeness of a perfect plant, so the Fungus grew less like one. The white furry "mould" on bread or preserved fruit, the "mildew" on grapes and lilac leaves, the "black knot" of cherry and plum, the "ergot" of rye, the "rust" of wheat, do not look like plants unless you study them through a magnifying glass. Nor do the "slime moulds" or the mushrooms, toadstools, puff-balls and truffles bear much resemblance to flowers. Some of these, however, are both pretty and useful.

In the case of a Lichen the partners really seem to be of use to each other. The Fungus is not a mere pauper living on his more active kinsman. If you examine a Lichen you will find a large number of transparent threads, and in their meshes lie the green Algae, giving the whole a greenish tint. The little cups or

discs of the Fungus that appear on the surface are lined with vivid colors, and have delicate little bags or sacs, with seed-like spores inside. The Fungus supplies a shelter from extreme cold, and also holds water in which the Algae finds raw material. It is like a man and wife housekeeping, the man providing the house and the raw stuff—flour, eggs, sugar, etc.—and the wife makes these materials into food. Plants, by aid of their green stuff, work over the carbon and other materials they get from air and water and make sugar and starch, or organized food. This is their manufacture and they must have an abundance of light to do it well, so when the sea Algae grow to be immense kelps or seaweed, hundreds of feet long, they are kept afloat by their air bladders. Now, it is true the Fungus in our Lichen could not live at all without its busy Alga, which it holds in its transparent filaments, but it is not a useless partner, so we will not call it evil names. I think you will be surprised to hear, after all the warning given by these dependent and generally worthless idlers in the plant world, some of the beautiful and blooming flowers have fallen into their bad habits and are regular underground thieves.

For the *Gerardia* or false foxglove has established no partnership; it is plain

stealing. It still works, so it has not lost its green of the leaf, or the purple and gold of its flower, but it steals the materials for its work. When it becomes utterly idle and useless it will lose all its color and be like the ghostly white Indian pipes that grow in the shadowy pine woods.

It is interesting to know how it steals. In the dark basement chambers underground the root servants of the plant move slowly in a certain circle that corresponds to the circle of light that the branches describe overhead. Within this space they gather chemicals from the soil and store up moisture, sending these by the sap up their elevators to the well-lighted leaves, where the manufacturing of starch and sugar goes busily on. Now, the *Gerardia*, being too trifling to collect its own stuff, sends suckers into the roots of other plants and greedily absorbs their contents. That is the reason it is so hard to transplant the *Gerardia*—its roots are enmeshed and entangled so in other roots below ground. A very odd thing sometimes happens to it. In the dark the roots occasionally blunder and tap other roots of the same *Gerardia*, just as if a pickpocket in the dark were by mistake to put his hand slyly into his own pocket and steal his own purse.

ELLA F. MOSBY.

O violets tender,
Your shy tribute render!
Tie round your wet faces your soft hoods of blue;
And carry your sweetness,
Your dainty completeness,
To some tired hand that is longing for you.

—May Riley Smith.

THE GREAT NORTHERN SHRIKE.

(*Lanius borealis*.)

Of the great family Laniidae, the shrikes, of the order Passeres, we have in America only two species, the Great Northern Shrike, *Lanius borealis*, and the loggerhead shrike, which has been dealt with in a previous article. The name of the Great Northern Shrike is much more than a mouthful, and is all out of proportion to the size and importance of the bird, though when I intimate it lacks in importance I by no means wish to say that it lacks in interest.

There are two hundred species of shrikes altogether, nearly all of them being confined to the Old World. When one comes to know fully the characteristics of the creatures he feels that the birds would not have been out of place if they had been classed in the order Raptores, because they possess the distinguishing traits of the bird of prey. The shrikes, however, do not have talons, and they are singers of no mean order, facts which perhaps disqualify them for association with their larger rapacious brethren.

The Great Northern Shrike, more commonly perhaps called Butcher Bird, comes from northern British-American territory to the latitude of Chicago in the fall and stays through the winter, when it leaves for the vicinity of Fort Anderson in the crown territories, to build its nest. This is placed in a low tree or bush and is composed of twigs and grasses. The eggs number four or five. During the winter the shrike's food consists almost entirely of small birds, with an occasional mouse to add variety. In the summer its diet is made up chiefly of the larger insects, though at times a small snake is caught and eaten with apparent relish.

The Great Northern Shrike has the habit of impaling the bodies of its victims upon thorns or of hanging them by the neck in the crotch of two small limbs. The bird has a peculiar flight, hard to describe, but which, when seen a few times, impresses itself so upon the memory

vision that it can never afterward be mistaken, even though seen at a long distance. The Great Northern's favorite perch is the very tiptop of a tree, from which it can survey the surrounding country and mark out its victims with its keen eye. In taking its perch the shrike flies until one gets the impression that it is to light in the very heart of the tree. Then it suddenly changes direction and shoots upward almost perpendicularly to its favorite watch tower.

The Great Northern Shrike is larger and darker than its brother, the loggerhead. It is also a much better singer. Its notes being varied and almost entirely musical, though occasionally it perpetrates a sort of a harsh half croak that ruins the performance. In general appearance at some little distance the shrike is not unlike a mocking bird. The description here given for the adult answers for both male and female: Upper parts gray; wings and tail black; primaries white at the base, secondaries tipped with white or grayish; outer, sometimes all the tail feathers, tipped with white, the outer feathers mostly white; forehead whitish; lores grayish black; ear coverts black; under parts white, generally finely barred with black; bill hooked and hawk-like. Immature bird similar, but entire plumage more or less heavily barred or washed with grayish brown.

One has to have something of the savage in him to enjoy thoroughly the study of the shrike. As a matter of fact, the close daily observance of the bird involves some little sacrifice for the person whose nature is tempered with mercy. The shrike is essentially cruel. It is a butcher pure and simple and a butcher that knows no merciful methods in plying its trade. More than this, the shrike is the most arrant hypocrite in the whole bird calendar. Its appearance as it sits apparently sunning itself, but in reality keeping sharp lookout for prey, is the perfect counterfeit of innocence. The



GREAT NORTHERN SHRIKE.
(*Lanius borealis*).
About $\frac{3}{4}$ Life size.

LIBRARY
UNIVERSITY OF ALABAMA
TUSCALOOSA

Great Northern Shrike is no mean vocalist. Its notes are alluringly gentle, and, to paraphrase a somewhat famous quotation, "It sings and sings and is a villain still."

There is one compensation beyond the general interest of the thing for the student who has to endure the sight of the sufferings of the shrike's victims in order to get an adequate idea of its conduct of life. The redeeming thing is found in the fact that in the winter time the great majority of the shrike's victims are the pestilential English sparrows, whom every bird lover would be willing to see sacrificed to make a shrike's supper, though he might regret the attending pain pangs.

My own observations of the shrike have been limited to the city of Chicago and to the fields immediately beyond its walls. For those unfamiliar with the subject it may be best to say that in the winter season the shrike is abundant in the parks of the great smoky city by the lake, and not infrequently it invades the pulsing business heart of the town. No one ever saw the placidity of the shrike disturbed in the least. It will perch on the top of a small tree and never move so much as a feather, barring its tail, which is in well nigh constant motion, when the clanging electric cars rush by or when the passing wagons shake its perch to the foundation.

The Great Northern Shrike reaches the city from its habitat beyond the Canada line about the first of November. For four years in succession I saw my first Northern Shrike of the season on November first, a day set down in the Church Calendar for the commemoration of "All Saints." It is eminently in keeping with the hypocritical character of Mr. Shrike, sinner that he is, to put in an appearance on so holy a day. From the time of his coming until late March and sometimes well into April, the shrike remains an urban resident and harries the sparrow tribe to its heart's content.

As far as my own observation goes the Great Northern Shrike in winter does not put very much food in cold storage. I have never seen many victims of the bird's rapacity impaled upon thorns. Perhaps I should qualify this statement a bit by saying that I have never seen many

victims hanging up in one place. I have watched carefully something like a score of the birds, and while every one occasionally hung up one of its victims, there was nothing approaching the "general storehouse" of food, so often described. It is my belief that this habit of impaling its prey upon thorns or of hanging it by the neck in a crotch is one that is confined largely to the summer season, and especially to the nesting period.

The Great Northern Shrike has been said by some writers to be a bully as well as a butcher. I have never seen any evidence of this trait in his character. He does not seem to care for what some small human souls consider the delight of cowing weaker vessels. When the shrike gives chase to its feathered quarry it gives chase for the sole purpose of obtaining food. While the bird is not a bully in the sense in which I have written, it displays at times the cruelty of a fiend. It has apparently something of the cat in its nature. It delights to play with its prey after it has been seized, and by one swift stroke reduce it to a state of helplessness.

Every morning during the month of February, 1898, a shrike came to a tree directly in front of my window on Pearson street, in Chicago. The locality abounded in sparrows and it was for that reason the shrike was such a constant visitor. The bird paid no attention to the faces at the window, and made its excursions for victims in plain view. The shrike is not the most skilled hunter in the world. About three out of four of his quests are bootless, but as he makes many of them he never lacks for a meal. The Pearson street shrike one day rounded the corner of the building on its way to its favorite perch, and encountering a sparrow midway struck it down in full flight. The shrike carried its struggling victim to the usual tree. There it drilled a hole in the sparrow's skull and then allowed the suffering, quivering creature to fall toward the ground. The butcher followed with a swoop much like that of a hawk and, catching its prey once more, bore it aloft and then dropped it again as it seemed for the very enjoyment of witnessing suffering. Finally when the sparrow had fallen for the third time it reached the ground before the shrike

could reseize it. The victim had strength enough to flutter into a small hole in a snow bank, where it was hidden from sight. The shrike made no attempt to recapture the sparrow. 'It seemingly was a pure case of "out of sight, out of mind." In a few moments it flew away in search of another victim. The sparrow was picked up from the snow bank and put out of its misery, for it was still living. There was a hole in its skull as round as though it had been punched with a conductor's ticket clip.

It has been my experience that the Great Northern Shrike hunts most successfully when he, so to speak, flies down his prey. If he gets a small bird well started out into the open and with cover at a long distance ahead, the shrike generally manages to overtake and overpower his victim. If the quarry, however, is sought in the underbrush or in the close twined branches of the treetop, it generally succeeds in eluding the butcher. One of the most interesting incidents of all my bird observations was that of the attempted capture by a Great Northern Shrike of a small brown creeper. The scene of the action was near the south end of the Lincoln Park lagoon in Chicago. The creeper was nimbly climbing a tree bole, industriously picking out insects, as is his custom, when a shrike dropped down after him from its high perch on a tree which stood close and overshadowed the one from whose bark the creeper was gleaning its breakfast. The shrike was seen coming. The creeper, for the fraction of a second, flattened itself and clung convulsively to the tree trunk. Then, recovering, it darted to the other side of the bole, while the shrike brought up abruptly and clumsily just at the spot where the creeper had been. The discomfited bird went back to its perch. The creeper rounded the tree once more and down went the shrike. The tactics of a moment before were repeated, the shrike going back to its perch chagrined and empty clawed. Five times it made the attempt to capture the creeper, and every time the little bird eluded its enemy by a quick retreat. It was a veritable game of hide and seek, amusing and interesting for the spectator, but to the birds a game of life and death. Life won. I ever have be-

lieved thoroughly that the creeper thought out the problem of escape for itself. The last time the shrike went back to its perch the creeper did not show round the trunk again, but instead flew away, keeping the bole of the tree between itself and its foe. It reached a place of safety unseen. The shrike watched for the quarry to reappear. In a few moments it grew impatient and flew down and completely circled the tree. Then, seemingly knowing that it had been fooled, it left the place in disgust.

Of the boldness of the Great Northern Shrike there can be no question. It allows man to approach within a few feet and looks him in the eye with a certain haughty defiance, showing no trace of nervousness, save the flirting of his tail, which is a characteristic of the bird and in no way attributable to fear or uneasiness. One morning early in March, when the migration had just started, I saw two shrikes on the grass in the very center of the ball ground at the south end of Lincoln Park. They were engaged in a pitched battle, and went for each other much after the manner of game cocks. The feathers literally flew. I looked at them through a powerful field glass and saw a small dark object on the grass at the very point of their fighting. Then I knew that the battle was being waged for the possession of an unfortunate bird victim. The birds kept up the fight for fully two minutes. Then, being anxious to find out just what the dead bird was which had given rise to the row, I walked rapidly toward the combatants. They paid no heed to me until I was within twenty feet of the scene of their encounter. Then they flew away. I kept my eyes on the much ruffled body of the little victim lying on the grass and, walking toward it, I stooped over to pick it up. At that instant, as quick as the passing of light, one of the shrikes darted under my hand, seized the quarry and made off with it. It was an exhibition of boldness that did not fail to win admiration. I did not have the chance to learn what bird it was that had fallen a victim to the shrikes' rapacity and had been the cause of that battle royal.

The Great Northern Shrike when it is attempting to capture a mouse, or a

small bird that has taken refuge in a bush, hovers over the quarry almost precisely after the manner of the sparrow hawk. There are few more fascinating sights in nature than that of the bird with its body absolutely motionless, but with its wings moving with the rapidity of the blades of an electric fan. Sharply outlined against the sky, it fixes the attention and rouses an interest that leaves little room for sympathy with the intended victim that one knows is cowering below. A mouse in the open has little chance for escape from the clutches of the hovering shrike. Birds, however, which have wisdom enough to stay in the bush and trust to its shelter rather than to launch out into open flight, are more than apt to escape with their lives. In February last I saw two shrike-pursued English sparrows take to the cover of a vine-covered lilac shrub. They sought a place well near the roots. While flying they had shown every symptom of fear and were making a better pace than I had ever seen one of their tribe make before. The shrike brought itself up sharply in midair directly over the lilac, and there it hovered on light wing and looked longingly downward through the interlacing stems at the sparrows. It paid no heed to its human observer, who was standing within a few feet and who, to his amazement, saw an utter absence of any appearance of fear on the part of

the sparrows. They apparently knew that the shrike could not strike them down because of the intervening branches. They must have known also that owing to the comparative clumsiness of their pursuer when making its way on foot through and along twigs and limbs, that they could easily elude him if he made an attempt at capture after that manner. Finally the shrike forsook the tip of the lilac bush and began working its way downward along the outer edge of the shrub. When it had approached to a point as near as the sparrows thought was comfortable, they shifted their position in the bush. The shrike saw that the quest was useless unless he could start them to flight. He tried it, but they were too cunning for him, and he at last gave up the chase, the progress of which actually seemed to humiliate him. He flew afar off, where, perhaps, the prospects of dinner were better.

I once saw a goldfinch in winter plumage escape a Great Northern Shrike by taking a flight directly at the zenith. The shrike followed the dainty little tidbit far up, until the larger bird was only a speck and the little one had disappeared entirely. The shrike apparently could neither stand the pace nor the altitude, and the watchers, with whom the goldfinch was the favorite in the race, rejoiced with the winner.

EDWARD BRAYTON CLARK.

ORIOLE.

Hush! 'Tis he!

My oriole, my glance of summer fire,
Is come at last, and, ever on the watch,
Twitches the pack-thread I had lightly wound
About the bough to help his housekeeping—
Twitches and scouts by turns, blessing his luck,
Yet fearing me who laid it in his way,
Nor, more than wiser we in our affairs,
Div'nes the providence that hides and helps.

—James Russell Lowell, "Under the Willows."

THE FIRE-BIRD.

This Oriole is one of the most brilliantly colored of our common birds. The name oriole is from "aureolus," meaning, little bird in gold. Ruskin says that on the plumes of birds the gold of the cloud is put, that cannot be gathered of any covetousness.

There is a story to the effect that when, in 1628, Lord Baltimore was exploring the Chesapeake, worn out and discouraged, he was so much cheered by the sight and sound of the oriole that he adopted its colors as his own, hence the name, "Baltimore Oriole."

This bird, however, rejoices in several other cognomens, such as English Robin, Golden Robin, Hang-nest Bird, Fire-Finch, and Golden Oriole. He is both esthetic and utilitarian, being beautiful, musical, social and also useful in that he feeds upon insects most injurious to vegetation; especially the harmful small kinds passed over unnoticed by the birds of other species.

The Baltimore Oriole is fond of sweets. He has been seen to snip off the heads of white-headed or stingless bees and draw out the viscera through the ring-like opening, for the sake of the honey sack. How did he know it was there? How did he learn that he could get at it in this way? The poet naturalist, Thompson, well says of him:

"You whisk wild splendors through the trees,
And send keen fervors down the wind;
You singe the jackets of the bees,
And trail an opal mist behind.

"When flowery hints foresay the berry,
On spray of haw and tuft of briar,
Then wandering incendiary, .
You set the maple swamps afire."

While the Oriole's song is not especially melodious to me, it is fresh and cheerful, with something of a human element in its child-like whistle. Young

birds in the nest cry "cree-te-te-te-te."

This bird is fond of building near the habitations of men, selecting sites in door-yards, orchards, and lawns. He weaves an artistic habitation at airy heights, choosing strong, flexible material for the pendant, bag-like nest. In California, the Arizona hooded oriole weaves nests of the beautiful Spanish moss; but one occasionally uses the love-vine or yellow dodder to construct a gaudy, pocket-like nest. The Fire-bird would not do this, for it always selects for its nest grayish, bleached material in harmony with the limbs of the trees. An experiment was tried of placing a bunch of colored yarns near its nesting-place, in order to see what, if it used them, the choice of colors would be. It selected all the gray threads, and, when nearly done, a few blue and purple, but not a single red, or green or yellow strand. The strongest and best material is used for the part by which the whole is supported.

The Baltimore Oriole is sometimes on intimate terms with his relative, the Orchard Oriole. Last summer the latter had hung its pretty cup-shaped nest on a branch of weeping willow near my window. The tedium of her sitting was relieved several times by a morning call from Sir Baltimore. He would seat himself on a twig near her nest and utter a soft, clear note, which no doubt meant a greeting in bird language. When he went away a few moments later, his two notes sounded strangely like "A—dieu"—a translation for which Olive Thorn Miller is authority.

But his song and his speech were less heeded than the spectacle of his brilliant flight—

"For look! The flash of flaming wings
The fire plumed oriole."

Belle Paxson Drury.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



BRANDT'S CORMORANT.

(*Phalacrocorax penicillatus*.)

There are about thirty species of Cormorants which are distributed throughout the world. Ten of these are known to inhabit North America. They are ocean birds, yet they are also occasionally seen on the larger bodies of fresh water. The Pacific coast of North America and the shores of New Zealand are rich in species and their plumage is more beautiful than that of those found in other parts of the world.

The name Cormorant is derived from the Latin words *Corvus Marinus*, meaning marine crow or raven. This name may have been suggested by the fact that these birds are fond of sitting on an elevated perch, especially after a hearty meal. In this habit of seeking high perches, and because of their dark color, they resemble the raven or crow. The generic name *Phalacrocorax* is derived from the Greek words, meaning bald crow.

One of the species that frequents the coast of Europe is easily tamed and in early times was trained to fish for its master. There was even an appointment in the royal household known as the "Master of the Cormorants." When used in fishing "a strap is fastened around the bird's neck so as, without impeding its breath, to hinder it from swallowing its captures. Arrived at the waterside, it is cast off. It at once dives and darts along the bottom as swiftly as an arrow in quest of its prey, rapidly scanning every hole or pool. A fish is generally seized within a few seconds of its being sighted and as each is taken the bird rises to the surface with its capture in its bill. It does not take much longer to dispose of the prize in the dilatable skin of its throat so far as the strap will allow and the pursuit is recommenced until the bird's gular pouch, capacious as it is, will hold no more. It then returns to its keeper, who has been anxiously watching and encouraging its movements, and a little manipulation of

its neck effects the delivery of the booty."

The Cormorants are voracious eaters. They catch the fish, which is their usual food, under water by rapid swimming and with the aid of their hooked bills. On account of this habit of the bird the word Cormorant has been used synonymously with the word glutton, rapacious or avaricious when applied to a person who exhibits these traits.

Brandt's Cormorant, the bird of our illustration, is found on the Pacific coast from the state of Washington southward to Cape St. Lucas at the southern extremity of Lower California. In its habits it is gregarious and collects in great numbers wherever its natural food of fish is plentiful. These flocks present a very odd appearance and their long necks appear as numerous black sticks on the watery background.

Mr. Leverett M. Loomis well illustrates the habits of these birds in a report on the California Water birds. He says of a rookery "which is situated on a rock, or little islet, in the ocean at the extremity of Point Carmel, about fifteen yards from the mainland. This rock rises perpendicularly some forty or more feet above the water. At first sight it does not seem that it can be scaled, but closer inspection reveals that a foothold may be had in the seams and protuberances on its water-worn sides. Only on days when the sea is very calm can the rock be landed upon and then only from the sheltered channel separating it from the mainland. We first took a view of the rookery from the mainland. The Cormorants were very tame, remaining on their nests while we clambered down the sloping rocks and while we stood watching them on the same level, only a few yards away. They were equally tame when our boat drew nearer as we approached from the water. The clefts in the sides of the rock were occupied by Baird's Cormorant and the top by Brandt's. There were comparatively few

of the former, but of the Brandt's Cormorant there were upwards of two hundred pairs. Their nests covered the top of the rock, every available situation being occupied. Standing in one place I counted one hundred and eighteen."

He also states that the Cormorants remained on the nests till he fired his gun and they lingered on the edge of the rock while he walked among the nests a few yards away. On the rock were many piles of sardines, evidently placed near the nests for the use of the sitting bird.

The nests are nearly circular when placed on top of the rocks, and are usually constructed of eel grass. They are generally placed in the most inaccessible places and at various heights above the surface of the water. The Cormorants frequent the same locality from year to year and experience considerable difficulty in constructing their nests because of the gulls which frequently carry away the material as fast as it can be gathered. The young, when first hatched, are entirely devoid of plumage and their skin resembles a "greasy, black kid glove." It is said that the gulls feed upon these young birds.

Mr. Frank M. Woodruff relates the following observations, made during a recent trip to California. He says:

"The Brandt's Cormorant is the common species wintering in Southern Cali-

fornia. Like the California brown pelican and the surf-ducks, only the juvenile birds are found in the bay close to the city of San Diego. As one rows about the harbor close to the shipping docks and by the old deserted fishermen's huts along the slips, large numbers of Brandt's Cormorants and pelicans can be seen perched on and almost covering the sunny sides of the roof tops. They sit in rows like sentinels with the head well down upon the shoulders, undisturbed by the noise of traffic and only by continued rapping on the building with an oar can they be induced to take to flight. They will usually circle for a short time in a lazy manner and then return to their old position. The older birds are rather more wary and usually feed a mile or so from the shore, in flocks of from three to ten. The loose kelp floating in the bay attracts the smaller fish. Such places form their feeding grounds. After they become gorged with fish, they fly to the rocks along the jetties and to the cross bars of the buoys, which mark the deep water channels. The birds are perfect gluttons, and as I lifted it into the boat there dropped from the gular sack of one specimen that I shot, over twenty small fish. The beautiful iridescence of the dark copper-green plumage of the adult Cormorant can only be appreciated when the freshly killed bird is seen."

SETH MINDWELL.

MATE, OR PARAGUAY TEA.

It is a trite saying, but a very true one, that one-half the world does not know how the other half lives. This will apply to food and drink, as well as to other things, so widely do customs vary in different regions.

While tea, coffee and chocolate, all products of warm climates, have come into general use as table drinks over the greater portion of the globe, so as to be universally known, there is a beverage of similar use, the favorite of millions, which is practically unknown to the world at large.

Mate (two syllables) is the name of the prepared leaves of a shrub or tree belonging to the Rhamnes family, and has the scientific name of *Cassine gonhonha*, but is more generally known as *Ilex paraguayensis*, as it was first used by the Indians of Paraguay. It belongs to the natural order of the holly, to which it bears much resemblance. Its leaves are six to eight inches long, short stalked, oblong, wedge-shaped, and finely toothed at the margin. The small white flowers are borne in clusters at the axils of the leaves. It bears a four-seeded berry, but

the leaves are used for decoction, except for a very fine quality, which is made from the dried flower buds.

It abounds in the forests of Paraguay and Brazil, where it is a tree of considerable size. It is cultivated to some extent, but in this state remains a shrub, and the quality is finer. It may be gathered at any season of the year, and the leaves must become dry enough to pulverize before they are fit for use.

Where it is cultivated it is dried in metal pans, after the manner of Chinese tea, but far greater quantities are gathered in the forests and dried in the primitive method adopted from the Indians.

A drying floor is prepared by clearing a space of ground and pounding it hard with a mallet. On this a fire is built, and after the ground is well heated, it is swept off clean and branches from the neighboring forests spread upon it. Afterwards they are placed upon a rude arbor made of hurdles and a slow fire beneath completes the drying process.

When quite brittle the leaves are pounded in a mortar and reduced to small particles, but not to a powder. The preparation of it consists in placing a small quantity of it in a vessel, with sugar if desired, and adding a little cold water. After a little while boiling water is poured on and it is then ready for use. As the leaf particles do not settle well, it must be sipped through a tube. The natives for steeping it used a calabash gourd called mate, whence its common name, mate yerba, or calabash plant. These gourds are still often used, and are convenient, as they have a handle. Cocoa-nut shells, with handles of silver or other metal, are also popular. A reed

or a metal tube, with a small perforated bowl at the bottom is used to sip it through. This is called a bombilla.

It is customary with the Spaniards and Portuguese to offer mate to visitors.

In the gardens of that sunny region vineclad arbors are furnished with seats, where the family with their visitors will sit in the cool of the evening, each one supplied with a bombilla and a cocoanut or calabash bowl of mate. Through a small opening in the top of the vessel the tube is inserted and the grateful infusion is enjoyed while matters of interest are discussed.

Great virtues are ascribed to this drink. Its properties appear to be chiefly due to theine and caffeine.

In Chili and Peru it is in universal use, and is considered more necessary than meat. On the plains of Argentina the gaucho or cowboy washes down his dried beef with copious draughts of mate and is content with his meal. To northerners the taste is not agreeable. It seems weedy and slightly bitter. For shipment the leaves, when dried, are packed in oblong cases or bags made of rawhide carefully sewed. These packages contain 120 pounds each. Since the beginning of the seventeenth century this drink has been used in Paraguay, and its use now extends all over South America. It is estimated that the amount used annually exceeds 60,000,000 pounds.

It is being introduced into other countries and the time may come when the bombilla and the bowl of mate may become a rival of five o'clock tea in English and American parlors.

ANNA ROSALIE HENDERSON.

Behind the cloud the starlight lurks,
Through showers the sunbeams fall;
For God, who loveth all his works,
Has left his Hope with all!

—John Greenleaf Whittier.

THE AMERICAN BUFFALO.

(*Bison americanus*.)

The supremacy of man over the lower forms of animal life has no better illustration than that furnished by the rapid extermination of the American Buffalo (*Bison* or *Bos americanus*.)

Much less than a century ago, in immense herds, this animal swarmed over the prairies of the United States, unmolested except by the Indians who sought it for food and for the economic value of its hide. It was free to seek those localities which would furnish it the best and most abundant food supply. Even as late as the sixties of the last century the American Buffalo was represented by thousands upon thousands of individuals, whose numerous paths leading from the feeding grounds to a supply of fresh water were known to the frontiersman as "Buffalo trails." "In 1889 Mr. William T. Hornaday estimated the number of survivors to be eight hundred and thirty-five, inclusive of the two hundred then living in the Yellowstone Park under the protection of the government."

The passing from the face of the earth of this, the largest of the native animals of North America, has taken place within the last thirty years and this extermination may be laid at the door of the zealous hunter and trapper who systematically shot and destroyed them in order to obtain the small profit that their skins would bring. It is said that one of the railroads crossing the continent from the Mississippi river to the Pacific coast carried about two hundred thousand skins within a year after it was opened to traffic. One writer records the reception of over forty thousand pelts by a single firm in the year 1875. Many instances of the wanton butchery of this noble and useful animal might be mentioned, but it is much better illustrated by the absence of the Buffalo at the present time, from all localities, except where it is protected by the same hand which has brought about its destruction. In 1858, when a party was tra-

versing the country by wagon train from the state of Missouri to Mexico, they were continually surrounded by large herds of Buffaloes. An eye witness said, "In bands, in masses, in hosts, the shaggy, black creatures thundered along in front of us, sometimes from north to south, sometimes from south to north; for forty consecutive hours we had them in sight, thousands upon thousands, tens of thousands upon tens of thousands, an innumerable mass of untamed animals, the flesh of which, as we believed, was sufficient to provide the wigwams of the Indians unto all eternity."

The American Buffalo belongs to the ox tribe of the family of horned animals (*Bovidæ*). Among its immediate relatives are the musk ox of the Arctic regions of America, the yak of the mountainous regions of Tibet, the zebu, an East Indian species, the Cape buffalo, a ferocious animal of the central and southern portions of Africa, the Indian buffalo living in southern Asia and the European bison.

The European bison, like its American relative, has suffered from the hunter and the advance of civilization and is practically exterminated. It now exists only in a few forests on the Caucasus and in the famous forest and game preserve of the Czars of Russia called Lithuania. Here, protected by stringent laws through several centuries, the European bison has been saved from absolute extermination. "In former times this was different, for the bison ranged all over Europe and a large portion of Asia." In the time of Cæsar, according to his own record, they abounded in Germany and Belgium.

So it is with the American Buffalo. Were it not for government and private preserves this, one of the largest of living quadrupeds, would be unknown to future generations except by museum specimens. Correctly speaking, the American species should be called *Bison*. So universal,



LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

however, is the use of the term Buffalo that the word Bison would puzzle many people. Strictly speaking, the name buffalo should be applied only to designate the Cape and Indian species.

The original range of the American Buffalo extended from but little west of the Atlantic coast westward to the Rocky Mountains and from Mexico on the south northward to about the sixty-fifth degree of north latitude. By the trappers the Buffaloes were placed in two classes. Those that frequented the mountain ranges were called Bison. They were seldom seen on the plains, the home of the other class. Their limbs were shorter and stouter and better fitted for a rough country. There existed in former ages two other species entirely distinct from the animal with which we are familiar. They were much larger, possibly as large as an elephant, and were probably associates of the mastodon and the mammoth.

A fully adult male Buffalo will measure about nine or ten feet in length from the muzzle to the tail. Its height at the fore quarters is from five to six and one-half feet. The female is much smaller and weighs from seven to eight hundred pounds less than the male, the weight of which averages eighteen hundred pounds.

The Buffalo's massive head, with its short, curved horns which are set far apart on the broad forehead, is connected with the body by a short deep and narrow neck. From the neck the body rises, forming a large hump on the back over the forelegs, which gives the animal an odd and unwieldy appearance. This hump consists of fat and strong muscles which control the movements of the massive head. From the hump the body tapers downward so that the hind quarters are low and narrow. The anterior portion of the body, the forelegs and the head are covered with long hair. On the forehead and back the hair is curly and matted. In the early spring most of the long hair is shed, resulting in a modification of the color of the Buffalo. The new coat is a uniform grayish brown, deepening into black-brown in the mane, which covers the top part of the head, forehead, neck and under surface of the throat.

Captain Doyle in an article published in the American Naturalist says, "White

Buffaloes have frequently been seen and killed. All the Indian tribes regard them as 'big medicine,' but they have different superstitions regarding them. For instance Catlin, the painter, while among the Mandans in 1832, saw a white buffalo robe erected on a pole in their village as a sacrifice to the Great Spirit. It had been purchased from the Blackfeet, who killed the Buffalo, for eight horses and a quantity of goods. On the other hand, the Comanches believe it very dangerous to see a white Buffalo. In 1869 I saw a young Comanche, who had seen a white Buffalo, return to his camp almost dead with fear. He was taken into his tent, the medicine man was sent for and they smoked him and kept up incantations over him day and night for a week. When he came out he believed that he had had a very narrow escape from death. In 1859 a white Buffalo was killed by a white man on the north fork of the Red river. He desired to have it dressed to preserve it, but failed to get any Indian to undertake the task for a long time. At last he prevailed on a Comanche chief, named 'Horseback' to have the operation performed. 'Horseback' selected one of his squaws, had the medicine man of his band go through various ceremonies over her to preserve her life and then placed her in a tepee some distance from his camp, where the hide was taken to her by a soldier and brought away by him when dressed. No other Indian would look at the hide, much less touch it. Her food was left for her at some distance from the tepee and when the robe was dressed, medicine ceremonies were held over her before she was allowed to join the camp."

These gregarious animals, during the period of their supremacy, rarely remained for any great length of time in any given locality. Frequently, as if moved by a sudden and general impulse, the whole herd, made up of many smaller companies, each with its leader, would start, all the individuals moving in the same direction. No barriers seemed too great to overcome. Moving in a straight line they would swim or ford rivers, find some means of crossing chasms, but still move on as if led by some irresistible impulse.

These migrations, in many instances,

may have been due to the necessity of seeking a more plentiful supply of food, especially when the pastures in the more northern regions became covered with snow. This caused them to move southward. The northern tribes of Indians did not believe that the same individuals returned, as the climatic conditions permitted, but that the Buffaloes were produced in immense numbers under ground and that in the spring they came forth from a great mountain far to the south, a herd of new individuals coming north each season. Since the Buffaloes have disappeared from the plains, some Indians claim that the holes in the southern mountains, in which the Buffaloes were formed, have been closed by some evil spirit.

Dr. Brehm tells us that "among the Buffalo's perceptive senses those of smell and hearing rank first. In its mental qualities it does not differ from its other relatives. It is little gifted, good-natured and timid, incapable of rapid excitement, but when it is irritated it is apt to forget all considerations which generally influence it and it will then oppose an enemy with courage."

It would seem that the Buffalo depends upon the sense of smell rather than that of sight, for when running from danger it holds the muzzle near the ground and rushes with incredible swiftness in the opposite direction. Obstinacy is one of the most marked characteristics of the Buffalo. When once moved to a certain action nothing seemed to sway a herd from its decision. Boats on rivers have been known to stop and wait for the passing of a herd that was swimming across the stream. Railroad trains have also been brought to a standstill by the herds crossing the tracks.

The American Buffalo was in reality an inoffensive beast and its ferocious appearance was due to its great bulk. "They are not intractable to domestication, readily entering into friendly relations with individuals who treat them kindly; at least they learn to recognize their keeper and to love him to a certain degree."

Years ago the Buffalo was the friend of the American Indian. It furnished

him not only with food but its skin served him as a blanket and as a covering for his tepees. Its skin also provided the leather from which he made his clothing and footwear. At this time, as Moellhausen has said, "The Buffalo could, in a certain sense, be considered a domestic animal of the Indians, no diminution of the innumerable herds could be noticed; on the contrary, they thrived and multiplied on the rich pastures." Ever content if all their wants were satisfied, the American Indians killed only those that were required for their present needs. It was not till the white man visited them with his stock of glittering trinkets, so attractive to the red man, that he began to kill indiscriminately. He learned that the white man was pleased with their robes and that the flesh of the Buffalo delighted his taste; that he was willing to trade his trinkets for robes and flesh. It was then that the Indian's whole demeanor toward the Buffalo changed and he became the weak servant of the trader, bartering the lives of thousands of noble animals for valueless things which pleased his eye or caught his fancy.

The value of the Buffalo to the Indian's welfare can be shown in no better way than by quoting the words of Captain Butler. "What shall we do?" said a young Sioux warrior to an American officer on the Upper Missouri. 'What shall we do? The Buffalo is our only friend. When he goes, all is over with the red man. I speak thus to you because, like me, you are a brave.' It was little wonder that he called the Buffalo his only friend. Its skin gave him a house, its robe a blanket and a bed, its undressed hide a boat, its short, curved horn a powder-flask, its meat his daily food, its sinew a string for his bow, its leather a lariat for his horse, a saddle, bridle, rein and bit. Its tail formed an ornament for his tent, its inner skin a book on which to sketch the brave deeds of his life, the medicine robe of his history. House, boat, food, bed and covering, every want from infancy to age and after life had passed; wrapped in his Buffalo robe the red man waited for the dawn."

MR. CHAT, THE PUNCHINELLO.

A TRUE STORY.

If Mr. Chat were an ordinary performer he would doubtless select a spot in the center of the village square; he would put up his little stage and his drop-curtain and would send small boys all through the village with his flaming posters:

ATTENTION, EVERY ONE!

This Afternoon—in the Village Square

AT TWO O'CLOCK,

Mr. Yellow-Breasted Chat will give
one of his

REMARKABLE PERFORMANCES

Mr. Chat is acknowledged by all to be the best imitator, the most gifted singer, the finest elocutionist, the cleverest ventriloquist, the greatest athlete in all bird-dom.

MR. CHAT

ORATOR, SINGER, GYMNAST AND
PUNCHINELLO!

Don't fail to see him!

and by two o'clock the village square would be alive with people, and after the show the dimes would rattle into the hat and no one would go away disappointed, as Mr. Chat's poster would be nearer the truth than most posters of its kind.

All this if Mr. Chat were an ordinary performer, but he is not. His performance is so far ahead of anything that was ever advertised on a poster, that there are not dimes enough in all the world to buy it. You may set a day for him and invite all your friends, or you may take your friends and go seek him in his own haunts; you may try to coax, hire, threaten; you may do everything in your power; but Mr. Chat is a happy creature of inspiration, and makes dates with nobody.

When he will, he will—

You may depend on't;

And when he won't, he won't—

And there's an end on't!

His only tent is the blue sky; his stage-setting a jungle of trees near a swamp; his stage a thick bough near the top of a tree; his curtain the leaves of a white birch, or willow, or butternut; his orchestra and curtain-raiser the wind, and his audience his wife sitting patiently on the eggs in her nest, and—you, if you belong to Nature's elect and happen to be near the swamp at that moment and have the kind of eyes that really see and the kind of ears that really hear. Mrs. Chat can command the performance with one little bird sigh. You could not buy it with the wealth of the world. After the entertainment is over, Mr. Chat drives his wife from the nest and takes her place on the eggs while she flies out over the tree-tops for a little outing. Not many bird husbands are so considerate.

Once upon a time (you see the story is just beginning now) I happened to find myself in a pasture; not a tame, every-day, green pasture tacked on one end of a nice smooth farm—not at all! but a pasture on top of a high hill, with beautiful fields stretching out below it, and all pink and white with laurel. The cows, who, they say, do not care either for laurel or scenery, may not have liked this pasture, but I did. So when I had climbed the bars and seated myself on the top one to view the country, I saw at the far edge of the pasture, a jungle of trees, and I liked it still more, and determined to explore it. On the way I flushed a brown thrasher in a laurel bush, and he flew into the jungle. There seemed to be but one bird singing in all the neighborhood, and this song which was a peculiar one, lured me into the thicket. On I went very cautiously till the sound seemed to be directly overhead. I paused and listened and peered into the tree tops.

"Caw-caw!" cried the bird harshly.

"Nothing but an old crow," said I in disgust.

I started to go, when from the same spot overhead came a loud, clear double note, and again I waited.

"Meow! meow!" remarked my new friend.

"How stupid of me!" said I. "I might have known it was Mr. Catbird." But immediately there came a glorious trill—first over my head, then almost under my feet, then at my right hand, then at my left; though there was no flutter of wings or other sound in all the jungle. At last the fallen branch upon which I had been sitting gave way and I went into the swamp with a splash of mud. "Look out, look out!" came a sarcastic voice from the tree top.

"It is an escaped Poll-parrot," said I, to reassure myself, but I took out my handkerchief and mopped my heated brow. The unknown then proceeded to bark like a dog, quack like a duck, and squeal like a pig, with occasionally a measure of song in between. At last in desperation I seized a young sapling near at hand and shook it with all my might, thinking to frighten him into showing himself.

"Haw-haw-haw!" rang out clearly from the top of the very sapling itself.

"That is no bird," I announced to the swamp; "it is an imp of the forest trying to lure me to destruction in the jungle," and I turned and fled.

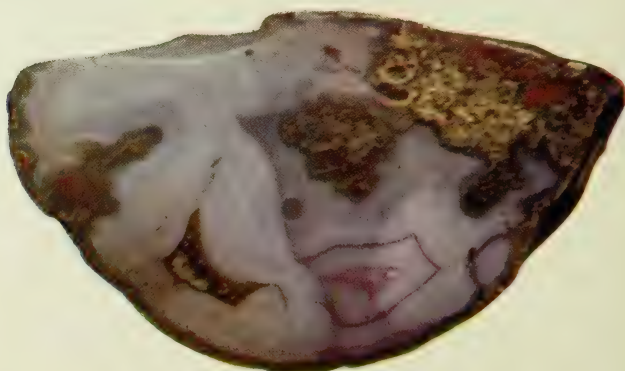
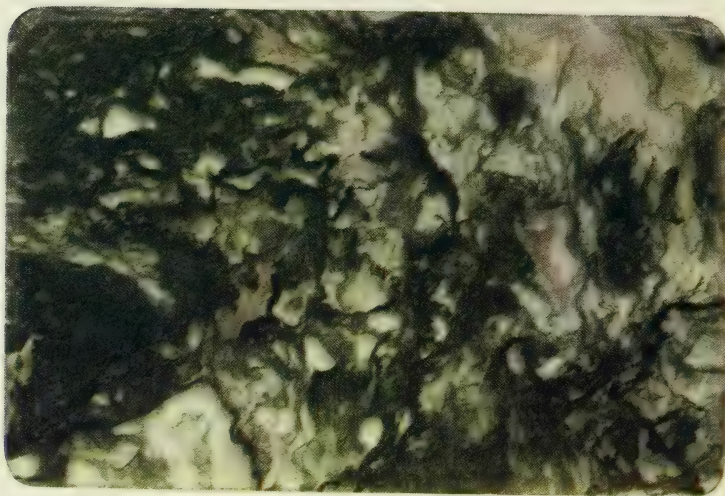
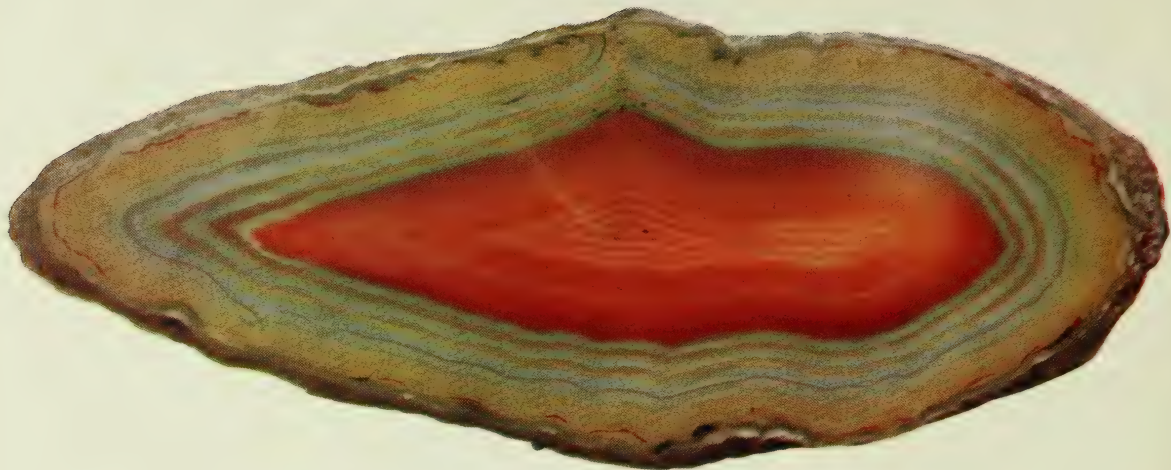
I felt better when I met a cotton-tail rabbit, though he did not stop to be greeted; and still better when I reached the sunlight and the pink and white laurel pasture; and when I neared the bars and saw my horse grazing patiently on the other side, I was quite myself again. On an upright stake at the side of the bars sat a strange, yellowish bird. I did not know him, for I had not so many bird friends then as I have now. Suddenly he rose in the air

with a shriek, his legs dangling helplessly. "Is this a magical pasture," I said to myself, "where birds are shot without the report of a gun?" and then with legs still dangling, he made a beautiful gyration in the air, and calling out: "That's it—that's it—tut—tut—tut!" disappeared in the direction of the thicket. This was my first attendance upon one of the remarkable performances of Mr. Yellow-Breasted Chat, and I can without hesitation pronounce it the most wonderful in all bird-dom.

The next day I invited some skeptical friends to prove the truth of my story. So at the same time of day we drove up the long hills till we spied the pink and white of the laurel, and halted at the gray bars. The pasture which had been deserted the day before, was now spotted with cows, the laurel had begun to fade, and though we waited one long, weary hour, not a sight or sound of a bird of any description did we see. The towhee and the shore lark whom I had seen the day before, seemed to have dropped out of existence, and those disagreeable people hinted that even the brown thrasher was a myth. But as I ventured alone into the dark swamp, hoping still to stir up Mr. Chat, I came face to face with the beautiful purple-fringed orchis—the large, early variety—blooming alone in the damp thicket, so straight and stately, and of such a delicate, refined beauty, I fell on my knees beside it, and felt it to be ample compensation for any disappointments. So you see it is true that there is not wealth enough in all the world to force a bird-song at the moment when you want it, but at the same time and in the same swamp the purple orchis may be blooming for you.

NELL KIMBERLY McELHONE.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



AGATE.

Agate is a form of the common mineral quartz. From other forms of that mineral it differs in being made up of minute layers and in being variegated in color. The colors may appear in the form of bands or clouds. The banded agates appear to be made up of parallel layers, sometimes straight, but more often wavy or curved in outline. These layers or bands differ in color from one another, exhibiting shades of white, gray, blue, yellow, red, brown or black. To the naked eye they appear to vary in width from the finest lines to a width of a quarter of an inch or more. In reality, all the bands visible to the naked eye are made up of finer ones, to be seen only with the microscope. Thus in a single inch of thickness of agate Sir David Brewster, using the microscope, counted seventeen thousand and fifty layers. Besides differing in color, the layers differ in transparency and porosity, and these properties add to the variegated appearance of the agate.

On account of their beauties of color and outline, agates have been known and prized from the earliest times. They are mentioned by many of the ancient Greek writers, and the name agate is a corruption of the name Achates, a river in Sicily, whence the first stones of this kind used by the Greeks were obtained. This and neighboring localities continued to be the source of supply until the fifteenth century, when agates were found to occur in large quantities near Oberstein and Idar on the banks of the river Nahe, in the duchy of Oldenburg.

The industry of cutting and polishing the agates on a large scale was soon established there, and these places are to this day the center of the agate industry. The agates used most extensively at the present time are not, however, those found about Oberstein, but come from a region about one hundred miles in length extending from the Province of Rio Grande do Sul, of Southern Brazil, into Northern Uruguay.

The agates in this region, first discovered in 1827, so surpass in size and beauty those from any other known locality, that they form at the present time almost the only source of supply. They are shipped in large quantities as ballast to Oberstein and Idar, and here the work of cutting, polishing and coloring them is performed. The discovery that the attractiveness of agates could be enhanced by artificial coloring was made about the beginning of the nineteenth century. The natural colors are rarely of a high order, being often only variations of white and gray or dull yellows and reds. Through the difference of porosity of the different layers, however, and the consequent different absorption of coloring ingredients, methods of artificial coloring can be employed, which produce lasting and pleasing effects. Most agate used for ornamental purposes at the present time is therefore artificially colored.

Agates of considerable beauty, though not of great size, are found in many places in the United States. Those of Agate Bay, Lake Superior, have rich colors and make attractive charms and other ornaments. Agates are found in the beds of many streams in Colorado, Montana and other regions of the Rocky Mountains. They occur all along the Mississippi River, especially in Minnesota, also along the Fox River, Illinois, in the trap rocks along the Connecticut River, and on the coast of California. While many of these agates are of great beauty, their use and sale is not likely to be anything more than local, since the Brazilian agates can be supplied so cheaply from Germany. The moss agates of Colorado and other localities in the Rocky Mountains are, however, equal to anything in the world.

The layered structure of agates is due to successive depositions of silica by water flowing through cavities in rocks. Rising and falling alternately through the rocks the water leaves a mark of each advance or retreat in the form of an ad-

ditional layer deposited upon the interior walls of the cavity. Agates, therefore, grow from the outside inward. The process may go on until the cavity is entirely filled or may cease at any time. If water remains in the cavity for some time crystals, such as are sometimes seen, will be formed. The nodule of silica or agate formed by the percolating waters is harder and more resistant than the surrounding rock. Hence it remains after the surrounding rock has been worn away. We can thus understand why agates should be found, as they usually are, on sea or lake beaches, or in the beds of streams.

The different colors seen in the natural agates are produced by traces of organic matter or of oxides of iron, manganese or titanium contained in the waters which formed them.

The beautiful moss-like inclusions seen in the moss agates are due to a partial

crystallization of oxide of manganese or iron contained in the waters. The particles of oxide in these cases arrange themselves in arborescent forms, just as do the particles of frost crystallizing on a window pane.

Agates are not used as extensively as they once were for ornamental purposes. In the years of 1848-50 agate jewelry was very fashionable and was extensively worn. At the present time, however, the principal use of agate in jewelry is for breastpins and watch charms. For ornamental purposes it is used in pen-holders, knife handles, and vases. Its use for large marbles was once quite common, but glass marbles of the same size and still called "agate" are now generally substituted. In fine mechanical work, such as bearings for delicate instruments and in tools for polishing and grinding, agate is still extensively used.

OLIVER CUMMINGS FARRINGTON.

MARTYRS OF THE WOODS.

Would we miss them, you and I,
Would we care if soon should die
Every single singing bird
You and I have ever heard?
Would we miss them from the grass,
Through the tangled, deep morass;
From the bushes and the trees—
Robin, wren and chickadees—
Birds of blue and crimson wing;
Would we miss the notes they sing;
Would we miss the call and cry;
Chattering talk as we go by;
Nests amid the reeds and grass,
Nests swung high above the pass?
Do we care that birds must die,
Slaughtered daily as they fly?
Men will kill while people choose
Wings of birds to buy and use;
Soon the woods must quiet be;
Scarce a bird for minstrelsy.

— George Klinge.

A PANSY BED.

There is ever so much fun in a pansy bed. If you have never had one, ask your papa or mamma to let you have one this summer. A few dozen plants will give you much pleasure.

There are so many little faces to know among them, and so many little family groups. Some grin at you like monkeys, others scowl, some seem to wink, some smile shyly, while others are curious and open-eyed. There is a white family delicately blue-veined—Colonial Dames, I call them. There are negroes of the darkest hue, Indians, and those that the sun seems to have bronzed. There are groups of Chinamen with their little “yellow kids.” Some are tattooed, and some have striped skin. Many wear ruffled bonnets, and some have beards. The little clusters are so erect and alert on a morning after a heavy dew that they seem like families off for an outing or school children waiting for a snap shot. There are lovely grandmothers wearing purple caps with white frills, and with faces though crinkled and wrinkled yet full of smiles and wisdom. There are sweethearts too, their little heads close together, and they whisper, whisper when the wind goes by.

What do you think? One day from out of my bowl of pansies which I had placed on the lunch table skipped two frisky “yellow kids.” I discovered them hand in hand skipping away. Their little figures were reflected in the polished surface of the table, and they seemed partners out of a Virginia reel. As I put them back in the bowl among their elders, I felt that I had wantonly interrupted a runaway.

Watch how the pansies love the rain! As they seem praying for it with bent heads in dry weather, so they seem a-quiver with thanksgiving after a shower.

There are many things you can do with your pansies. First, though, you must love them. You must teach pussy and the dog not to tramp over them. Every day you must take off all the faded flowers.

You must water them and weed them. You will enjoy gathering a bouquet daily for the house, and if anybody is ill, papa or mamma or some one else you love, by all means carry them a bunch of your pansies.

In midsummer, when the fairies have pitched their tents about the sweet-scented bed, the blossoms will have become so many that if grandpa or grandma has a birthday, you can gather seventy or eighty (possibly ninety if you need so many) for a birthday gift. You will not see the fairies about the bed, for they come at midnight, but the dew-sprinkled tents are there, and the cluster of toadstools that the brownies like so well.

Do not forget to give some flowers to the poor children who stand outside your gate, and who wish for some for their very own. The children who have no garden love to look at yours.

Perhaps you have an older sister or brother who paints. If so, they may like some of your pansies to sketch, and to keep in the house in the winter when your real ones are tucked under the earth and snow.

You will find several live things in your flower bed; the bees, the butterflies, and once in a while a humming-bird. Sir Bumble, the bee who looks so heavy and clumsy, touches lightly the pansies, and the pansies like to have him about, for he is so lively and cheery, so do not drive him away. The light yellow and the deep yellow butterflies seem like the pansies themselves, flying off from their stems for a journey about the country. Who knows what the butterflies and the bees tell the flowers, or what messages the flowers send by the flying creatures that pay them visits? When you have pansy beds of your own perhaps you will be able to write me some stories, and then perhaps you can tell me what the butterflies, bees and pansies talk about.

GRACE MARION BRYANT.

THE MULLEN.

Most of the familiar or useful plants have had their origin or characteristics accounted for by myths or legends, whereby the ignorant and superstitious have attempted to explain such features as attracted their attention. Some of these ideas were creditable to the plant, while others were quite the contrary. The Mullen appears to have led a dual existence, seeking an alliance with the spiritual world and at the same time aiding and abetting the witches in their nefarious undertakings.

A very pretty story concerning the Mullen is attributed to the American Indian, but in some regards it seems to be a variant of the Scandinavian Tree of Life myth. It appears that the Great Spirit of the red men lived at the top of a high tree whose branches reached to the heavens; as no mortal could attain to this high attitude, a spirit of the woods, in the guise of a beautiful maiden, took pity upon the people and so fashioning a ladder from the stems of the wild grape vine, she fastened it to a star. In order that the Great Father might not be disturbed, the fair sylvan carpeted the steps of the ladder with the velvet leaves of the Mullen, upon which she noiselessly ascended and descended, bearing the petitions of the red men or bringing to them advice or admonitions.

Of the one hundred and twenty-five species of Mullen that are native to the old world, five have become naturalized in the United States. The Great Mullen (*Verbascum thapsus*), so familiar in dry, open fields, was originally christened by Pliny and has since received over forty English names of a less classical origin and significance. The name *Verbascum* is supposed to be derived from *Berbas-cum*, meaning a beard. Pliny doubtless selected this name, either because of the hairs on the stems of the plants or on

account of the silky character of the leaves. The specific name, *thapsus*, is said to have been added, as the plants grew in considerable numbers in the vicinity of Thapsus.

One of the significant but impracticable common names of the Great Mullen is Hag-taper. The plant gained this unpleasant appellation by reason of the fact that if any one steps on a young Mullen plant after sundown, the witches will ride him as a horse until morning, lighting the way with Mullen stalks used for torches. These torches were also employed at the meetings of the hags and witches, when the leaves of the plant were an important element in the concoctions prepared in their cauldrons. Another name is Hare's Beard, illustrating a class of plants that have weird names because of some fancied likeness to animals. The name Cow's Lungwort, arose from the resemblance between the leaf and the dewlap of a cow, from which it was argued that the plant must be a specific for lung diseases. In England, where the Mullen is known as Blanket Leaf, the dried leaf is tied around the throat in cases of colds. It is believed that the leaf sets up a mild irritation which will be beneficial. The dried stalks of the plants were often used for torches at funerals which gave rise to the names High or Hedge Torch. The Great Mullen varies in height from two to seven feet. The stem is stout, very woolly, with branching hairs. The oblong, pale green, velvety leaves form a rosette on the ground or alternately clasp the stem. The flowers, which are about an inch in diameter, are clustered around a thick, dense spike, and have two long and three short stamens, so arranged as to materially assist the process of cross fertilization which is largely carried on by bees. It is interesting to note in connection with the thick woolly covering of the plant



423

GREAT MULLEN OR VELVET DOCK
(*Verbascum thapsus*).



MOTH MULLEN.
(*Verbascum blattaria*).

FROM "NATURE'S GARDEN"
COPYRIGHT 1900, BY
DORLAND, PAGE & COMPANY.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

that many vegetable forms are so protected when exposed to intense heat or cold. This is true of most alpine and desert forms and the value of such a protection to the Mullen will be seen when it is remembered that the plants are always found in open, dry, stony fields exposed to the fierce heat of the sun, and afforded no protection for the rosettes of year-old plants which must survive the winter in order to send up the flower stalk the second spring.

The Moth Mullen (*Verbascum blattaria*) is a far more attractive and graceful plant than the form previously described. The specific name was derived

from the idea that the plant would kill the cockroach (*Blatta*). It was supposed that moths would not go near the plant, and it was quite a general custom in New England to pack these plants or flowers with clothing or furs in order to keep out moths. The stamens are similar to those of the Great Mullen, except the filaments are tufted with violet hairs. The flowers are yellow or white on long, loose racemes. The erect, slender stem is usually about two feet in height, and as a rule there are no leaves present at the flowering time.

CHARLES S. RADDIN.

THE CALL OF THE PARTRIDGE.

The fields are wet, the fields are green,
All things are glad and growing,
And fresh and cool across the pool
The gentle wind is blowing.
Tho' humid clouds yet fill the sky,
The rain has ceased its falling,
And from his rail across the swale,
I hear the partridge calling,
The spotted partridge calling.

Through the silence not a note
His listening ear is greeting.
But hear! O hear—how loud and clear
His call he is repeating,
What pleading lingers in his tone,
What tenderness revealing.
O, soft and sweet across the wheat,
A timid answer's stealing,
The timid answer's stealing.

—Belle Hitchcock.

JIM CROW AND HIS COUSINS.

While much can be said about the beauty and grace of birds of brilliant plumage and those of soul-stirring song, there is as much to be written concerning those noted for their sagacity and cunning. Some have selected the parrot as the model in this particular and the choice is not a mistake.

There is, however, a tribe which all may observe more or less, while a story relating to their habits or pranks will ever find willing listeners. The Crow is the best known of this genus, and grouped with him are the chough, the raven, the rook and the jackdaw. All of these may be tamed, and afterward may be taught to use the language of man.

The plumage of the Crow in the northern parts of the world is black, and we are so accustomed to that color that to speak of a white or of a spotted Crow might subject one to ridicule, yet in many parts of the world such Crows are found. Some are gray and black, and some species are larger than others. They are characterized by a comparatively short tail, long wings, and a strong, rather conical beak.

Crows are distinguished from ravens by their smaller size, and by the feathers of the neck blending with those of the body, while on the ravens, the neck feathers are pointed and distinct. The Crow family is widely distributed, but Crows, as properly understood, are mainly inhabitants of the north temperate zone. They are intelligent, wary birds (when persecuted), and are practically omnivorous, feeding upon fish, fowl, eggs, snakes, frogs, crabs, shell-fish, grubs, fruits, seeds and berries. The common Crow of North America is particularly abundant in the Eastern United States, and is looked upon as the inveterate foe of the farmer on account of the amount of injury he inflicts on growing crops, and especially upon corn. There is, however, a credit side to the account in the destruction of grubs; but as the

Crow is by nature such a pilferer, he must be regarded as harmful in many ways.

In the fall and winter these glossy birds assemble by thousands in great roosts, or rookeries; one of these roosts on the Potomac above Washington has been estimated to harbor 40,000 Crows, while others are still larger. In the gray of the morning the birds leave in clamorous crowds for their feeding-grounds, often many miles away, and in the afternoon may be seen winging their way homeward in long lines, high above the earth in fair weather, low down in foul. The eastern fish crow, frequently found in company with the others, is a smaller bird, and can readily be distinguished by its hoarse caw.

The Carrion Crow of Europe and Asia closely resembles the North American Crow in form, size and habits, but is perhaps a little more destructive, attacking and killing lambs, or even weakly sheep. The Hooded Crow, found in northern and eastern Europe and in many parts of Asia, is gray, with black head, throat, wings and tail. The Gray-necked Crow of India is a small but bold and mischievous species, often stealing the very food from the table. On the other hand, it does much good as a scavenger, forming an able adjunct to the vultures in this respect.

An interesting story is told of a Crow of this species which had been tamed and petted until it behaved much as would a spoiled child. "Old Crusty," as he was called, would actually take the food away from the dog while he was eating, not by open encounter, for that would have deprived him of his fun. But he would tease the poor canine until he barked from vexation, then snatch up the prey and triumphantly bear it off to a neighboring tree, where he ate it at his leisure, while the dog stood looking at him and uselessly venting his rage in loud, threatening barks.

The annual "muster" of the Crows,

like that of blackbirds, is a scene very amusing, as well as mysterious. It has been my privilege to witness a few such gatherings, but to me there seemed more noise than meaning. It is said by naturalists, however, that the most extraordinary meetings of the Crows occur in northern Scotland. There they collect in great numbers, as if they had all been summoned for the occasion; a few of the flock sit with drooping heads, and others seem grave as judges, while others again are exceedingly active and noisy. One authority says: "These meetings will sometimes continue for a day or so before the object, whatever it may be, is completed. Crows continue to arrive from all quarters during the session. As soon as all have arrived a very general noise ensues, and shortly after the whole fall upon one or two individuals and put them to death. When the execution has been performed they quietly disperse."

The Chough is a red-legged Crow and is one of the most mischievous birds of his genus. He carefully examines everything he finds, then carries it away if he can. And if there be a collection of anything to which he has access, he is sure to scatter it in all directions. Those which have been converted into pets have proven very affectionate, but they are easily offended and will often vent their spite in a most annoying yet very amusing manner.

The Raven is very much like the Crow in his habits, but is more given to fighting and to burglary than his shy cousin. He is a great tease, also, and will often attack children and even grown up people just for fun. By this it can be seen that the Raven is more susceptible to taming than the Crow, while no old Crow can steal so many articles or hide them as completely as the Raven. They are quick to make friends with dog or man, but, like the Chough, are very troublesome foes when once offended.

The Rook is a European bird, and though the farmer recognizes in him a destroyer of his young crops, he must admit that without the Rook he would save little or none of his crop. Worms constitute the favorite food of this bird, wherefore many a husbandman has

learned that it is best to endure the disadvantages of a rookery merely for the sake of his harvests. For one queer habit of Rooks is that they will frequent the same spot all their lives, and it is next to impossible to dislodge them from their abode.

The Jackdaws are the boldest of the genus, and have a very remarkable "don't care" look. They frequent high towers, hollow trees, and even appropriate to their own use the loftiest parts of the English castles. They choose their mates for life, and do not live in communities. They assemble in flocks, however, when cherries begin to ripen and will soon rob a tree if the owner is not on guard.

An amusing story is told of a tame Jackdaw. While pilfering one day he found a half-glass of whisky which had been left upon a table, and on tasting it, he liked it so much that he drank a quantity. In a few moments symptoms of intoxication began to appear; his wings dropped and his eyes were half-closed. He staggered towards the edge of the table, probably intending to fly to the floor, but he had either lost the power of his wings or he was afraid to trust them. He stood, seemingly meditating what he should do, all the while reeling like a drunken man about to lose his balance. Presently his eyes were shut and he fell over on his back with his legs in the air, exhibiting every sign of death.

An attempt was made to put some water down his throat, but he could not swallow it. He was then rolled in a piece of flannel, laid in a box and locked away in a closet. All the family, with whom he was a great pet, never expected to see him on his legs again. Next morning about six o'clock the door was opened, with the expectation of finding Jackie dead, but he had freed himself from the flannel and as soon as the door was open he flew out and hurried away to a basin-shaped stone, out of which the fowls drank, and copiously allayed his thirst. He repeated this several times that day and was none the worse for his exploit, but, with more forbearance than those who are endowed with reason, he never again would touch whisky.

CLAUDIA MAY FERRIN.

COCOA.

(*Theobroma cacao*, L.)

The wretch shall feel
The giddy motion of the whirling mill,
In fumes of burning chocolate shall glow,
And tremble at the sea that froths below!

—Pope, "Rape of the Lock," ii, 135.

The cocoa-yielding plant is a tree varying from fifteen to forty feet in height. The main stem or trunk is much twisted and knotty, from which the branches stand out almost horizontally. The bark is thick, rough and of a cinnamon brown color. The leaves are alternate, large, smooth, entire, and of a deep green color. Flowers occur singly, more usually in clusters, from those parts of the branches and trunk formerly corresponding to the axils of leaves. Calyx deeply five-cleft, pale red. Petals pink. Fruit solitary or several together, pendulous, large, pear-shaped; each pericarp enclosing numerous brown seeds about the size of a hickory nut or almond, from which the chocolate and cocoa are made.

The chocolate tree is a native of Mexico, Central America, Brazil and other South American countries. It is now extensively cultivated in most tropical countries of both hemispheres. The West Indian islands have numerous large plantations. It is also found in botanic gardens and greenhouses. There are several cultivation varieties.

The cocoa or cacao yielding plant must not be confounded with the coco-nut palm or the coca-yielding plant which has already been described.

The natives of Mexico used cocoa before the discovery of America by Columbus. The Toltecs cultivated the plant centuries before they were finally conquered by the more powerful and more progressive Aztecs in 1325. Cortez and Fernandez in their letters to Charles V. of Spain referred to the cultivation of cocoa by the Mexicans who used the seeds not only as a food but also as a

medium of barter and exchange. It was apparently the only medium accepted in the payment of provincial taxes. Humboldt states that cocoa was similarly employed in Costa Rica and other Central American countries.

In remote times cocoa was somewhat differently prepared from what it is at the present time. The roasted and hulled seeds were coarsely pulverized in a stone mortar, strongly spiced by means of vanilla and other spices, boiled in water and when cold stirred to a frothy semi-liquid in cold water and eaten cold. The word chocolate is said to be derived from the Aztec *chocolatl* (*choca*, frothy and *atl*, water). Through Cortez and others who lauded very highly the value of cocoa as a nourishing food for those going on long journeys, it soon became widely known. In 1520 considerable quantities of it, pressed into cakes, were shipped to Spain. Remarkable as it may seem, it is stated that the Brazilians learned the use of cocoa from the Spaniards. The noted Italian traveler Carletti (1597-1606) introduced the use and preparation of cocoa into his native city, Florence. Not all Europeans gave favorable reports concerning the use of cocoa. Clusius stated that it was more suited to hogs than human beings. Acosta stated that the drink had "a nauseous aspect and caused heart troubles." Cocoa was introduced into France about 1615, England about 1667, Germany about 1679. Somewhat later chocolate houses were established in various cities of Europe. William Homburg, a chemist, of Paris, extracted the fat from cocoa as early as 1695, and Quelus (1719) recommended

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



COCOA FRUIT.

its use as a salve and as an article of diet.

The fruit of the wild growing plants is small and the seeds exceedingly bitter, hence the cultivated cocoa is preferred. The seeds are prepared in two ways, fermented and unfermented. In the former the seeds are placed in heaps in holes in the earth, in boxes or barrels, covered with leaves. In the course of four or five days they begin to "sweat" or undergo a mild form of fermentation. During this time the seeds must be stirred about occasionally. At the close of the sweating process most of the bitterness is gone and they have lost about one-half in weight. Afterwards the seeds are rapidly dried in the sun or in ovens. The fully dried seeds have a rich brown color. The following are the more important market varieties of fermented cocoa:

1. Mexican or Soconusco Cocoa.—Seeds rather small, delicate flavor and of a golden yellow color. Since Mexico does not produce sufficient cocoa for home consumption this variety is rarely exported. This and the following varieties are said to be derived from *Theobroma bicolor*, *Th. angustifolium* and *Th. ovatifolium*.

2. Esmeralda Cocoa.—Similar to the Mexican; somewhat darker in color.

3. Guatemala Cocoa.—Seeds large, with mild flavor.

4. Caracas Cocoa.—From Venezuela. Color pale brown, with a mild, agreeable flavor. Usually coated with a film of soil due to their being buried in the earth during the sweating process. A very highly priced variety.

5. Guayaquil Cocoa.—From Ecuador. Seeds flattened, somewhat wedge-shaped, wrinkled, reddish brown. An excellent variety.

6. Berbice Cocoa.—From British Guiana. Seeds small, externally gray, internally reddish brown.

7. Surinam and Essequibo Cocoa.—Seeds rather large and more firm; externally a loamy gray, internally deep reddish brown. Taste somewhat bitter.

The unfermented cocoa, also known as sun cocoa and island cocoa, is dried rapidly without fermenting. It is of a beautiful reddish brown color and a bitter

astrigent taste. The following are the principal varieties:

1. Brazilian (Para, Bahia) Cocoa.—Seeds smooth, wedge-shaped, flattened. One edge nearly straight, the other convex.

2. Cayenne Cocoa.—Quite hard, externally grayish brown, internally purplish red.

3. Antilles Cocoa (Island Cocoa).—Of this there are the following varieties: a. Trinidad cocoa, with large, flat, almost black brown seeds; b. Martinique cocoa, with elongated, flattened, reddish brown seeds; c. St. Domingo cocoa, with small, flattened, dark purplish brown seeds.

Cocoa requires considerable care in cultivation. A moist atmosphere and uniform temperature of about 24 to 28 degrees C., with considerable shade, is best suited. The tall variety of banana and the tree-like *Erythrina Corallodendron* are the more common shade plants. The plants are grown from seeds which begin to germinate in eight days. The trees begin to bear fruit in about four years. More usually eight to ten years elapse before any considerable fruit is borne. Two crops are collected annually. It is stated that there is on an average only one fruit to every 3,000 flowers.

Chocolate and cocoa are prepared by roasting the seeds, removing the husks and crushing between hot rollers, which liquefies the solid fat and forms a paste. To make chocolate sugar is added and flavored with vanilla and cinnamon. Sometimes a coloring substance is added. The paste is finally moulded into cakes varying in size and form. Chocolate is frequently adulterated with lard, starches, rice flour and other substances. Cheap grades are usually flavored with sassafras nuts, cloves and other spices. In the manufacture of cocoa the husks are usually included and mixed with a variable quantity of sugar, starch, flavoring substances, etc. The roasted, hulled and coarsely broken seeds are known as cocoa nibs, and this is the purest kind of cocoa. The powder made from the seeds after the oil has been thoroughly expressed is known as broma.

The seeds contain about 50 per cent of fat. In the manufacture of broma and common cocoa most of this is removed and is placed upon the market as cocoa butter. The more or less broken hulls are sold as cocoa shells, from which a chocolate-like drink is made by boiling in water and sweetening with sugar.

There is perhaps no food substance which is more universally liked than chocolate. Mothers have no small amount of trouble in hiding the household chocolate from the children. With the omnipresent penny-in-the-slot machine more pennies are credited to it than to the chewing gum. The housewife and baker use it very extensively with chocolate cake. The confectioner uses it very freely, to the great delight of children.

The principal use to which cocoa is put is in the preparation of a beverage. For this purpose enormous quantities of chocolate, cocoa, broma and hulls are consumed annually. The word "Theobroma" is derived from the Greek, meaning drink for the gods. The drink is prepared by thoroughly tritulating the desired amount of chocolate, cocoa or broma with a small quantity of water, then stirring this into the necessary quantity of boiling milk or water and

boiling for a few minutes with constant stirring. The oil present gives the drink great nutritive value. It is also slightly stimulating, owing to the presence of an alkaloid theobromine which is closely similar in its properties to theine and caffeine, the active constituents of tea and coffee. The drink does not agree with some individuals, because the large amount of oil present causes indigestion. It is also highly probable that the indigestion or dyspepsia is due to the minute fragments of roasted cell-walls of the seeds, which are not only indigestible, but irritate the secreting mucous cells lining the inner surface of the stomach.

Cocoa butter, which resembles tallow in consistency and appearance, is used in medical and pharmaceutical practice as a salve, or pomade, for external application in eruptive diseases, as scarlet fever, etc., etc. Cocoa also finds extensive use in medical practice, though it has no marked curative properties. Cocoa from which the oil has been thoroughly expressed (broma) makes an excellent drink for convalescents. It is used to disguise the taste of disagreeable medicines, etc.

Description of plate. Fruit and seeds.

ALBERT SCHNEIDER.

THE CANOE-BIRCH.

Like polished marble their tall shafts gleam
Beside some beautiful inland stream,
And their heart-shaped leaves in autumn's prime
Wear the golden tints of a fairer clime.
As I touch the bark, white as driven snow,
I dream of the seasons long ago,
When the Red Man paddled his light canoe
Where the canopied birches pierced the blue!

—George Bancroft Griffith.

BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. X.

SEPTEMBER, 1901.

No. 2

TO A HUMMINGBIRD.

Voyager on golden air,
Type of all that's fleet and fair,
Incarnate gem,
Live diadem
Bird-beam of the summer day,—
Whither on your sunny way?

Loveliest of all lovely things,
Roses open to your wings;
Each gentle breast
Would give you rest;
Stay, forget lost Paradise,
Star-bird fallen from happy skies.

Vanished! Earth is not his home;
Onward, onward must he roam
Swift passion-thought,
In rapture wrought,
Issue of the soul's desire,
Plumed with beauty and with fire.

—John Vance Cheney.

THE ANNA'S HUMMINGBIRD.

(*Calypte anna*.)

Buffon, writing of the Hummingbird, and his words do not refer to any single species, but to them as a group, says that "the emerald, the ruby and the topaz glitter in its garb, which is never soiled with the dust of earth, for, leading an aerial life, it rarely touches the turf, even for an instant. Always in the air, flying from flower to flower, it shares their freshness and their splendor, lives on their nectar and only inhabits those climates in which they are unceasingly renewed."

Of all the birds that might receive the appellation, "The Bird of America," to none could it be applied more truthfully than to the Hummingbird. For of all the families of birds that are distinctively peculiar to the Americas the Trochilidæ, or the Hummingbird family, contains the larger number of species. There are over five hundred species inhabiting North and South America and the adjacent islands, from Patagonia on the South to Alaska on the North. The species is more numerous in the tropics and but seventeen are known to frequent the United States. Of these only one, the ruby-throated hummingbird, exhibits its beauty east of the Mississippi River, and but seven species have their breeding range chiefly or entirely within the United States.

"They abound most in mountainous countries, where the configuration of the surface and productions of the soil are most diversified within small areas. Their center of abundance is among the Northern Andes, between the parallels of ten degrees north and south of the equator, from which region they gradually diminish in numbers both to the northward and southward, but much more rapidly toward the extensive lowlands of the eastern portion of the continent."

A very interesting group, not so gem-like as many of their sister species, is the hermit hummers represented by a number of species that chiefly inhabit Brazil. These hummingbirds are notable for their plain colors, their plumage having but little of the lustrous metallic iridescence which is so marked a characteristic of the species with which we are more familiar and which frequent flowers in the bright sunshine. The laws of Nature seem to provide against excess even in coloration. The hermit hummers obtain their food only from the insect world, feeding upon those species found on the leaves of trees in deep forests. In such a home a gorgeous dress would be out of place and needless.

Regarding their actions, Mr. Robert Ridgway says: "Hummingbirds are so distinct from other birds in their external structures and manner of flight that they present in every respect, except when at rest, an appearance entirely peculiar to themselves. They spend perhaps the greater part of their time upon the wing, usually hovering or balancing themselves before a flower from which they are procuring their sustenance of honey or of minute insects. At such time the body is nearly vertical or inclined at a slight angle, the head bent nearly at right angles with the axis of the body, the wings spread nearly at right angles with the same axis." The motion of the wings, which is always rapid, may carry the bird in a horizontal direction or poise it in its vertical attitude directly over a flower. In this latter position the motion of the wings is so rapid that a mere haze appears on each side of the bird's body. Mr. Gould, speaking of their flight, says "The bird does not usually glide through the air with the quick, darting flight of a swallow or swift, but continues trem-



ANNA'S HUMMINGBIRD.
(*Calypte anna*).
Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

ulously moving its wings while passing from flower to flower, or when taking a more distant flight over a high tree or across a river."

Such a dainty dress as that worn by most of the hummingbirds deserves constant attention. Appreciating this these little lovers of sunshine are very fond of preening their beautiful feathers. While thus engaged they usually perch on a bare or dead twig in an exposed position. Truly fortunate is he who is afforded the opportunity of watching a hummingbird at this time. In this position various and graceful attitudes are assumed and the colors of the plumage are most beautifully exhibited. Mr. Audubon tells us that when perching the hummingbirds "move sidewise in prettily measured steps, frequently opening and closing their wings, pluming, stroking and arranging the whole of their apparel with neatness and activity."

Hummingbirds are very aggressive and show no fear, especially when defending their nests. They will furiously attack any bird or other animal that excites their enmity. They have been known to follow and annoy hawks and other birds much larger than themselves.

Mr. Ridgeway says: "In their disposition hummingbirds are not only very tame but highly curious or inquisitive, and exhibit a special propensity to closely inspect a human intruder to their domain." This characteristic may be frequently noticed in the actions of our common ruby-throat. In spite of the fact that the hummingbirds are easily tamed and may even be induced to take food from the hand or from a flower so held as to attract their attention, they do not survive confinement for any length of time.

Although the nectar of flowers forms a large part of their food, it has been shown that insects also form no inconsiderable portion.

The high degree of intelligence possessed by the hummingbirds is shown in the construction of their nests. Some of the species make the nests "of such form or material as will serve to imitate natural excrescences of a branch, such as a knot or a pine cone." Other species make a hammock-like nest that they sus-

pend from cliffs by attaching spiders' webs. Mr. Thomas M. Brewer writes: "Indeed, it is probable that there is no other family whose architectural achievements are more varied than those of the hummingbirds. These variations include not only the material of which the nests are made and the positions in which they are placed; but also the general style of their construction, exhibiting constant differences, in the several species, in the ingenuity and beauty displayed in each design." Even individual species will change the usual plan of their nests in order to adapt them to the requirements of their environment. In favorable localities a new nest will be built each season on top of the old one of the year before. "The hermit hummingbirds fasten their elongated nests to one side of the extremity of long-pointed leaves for protection, it is supposed, against monkeys and other predaceous animals."

The eggs of the hummingbirds, invariably two in number, are white and free from spots. Though very small they are large when compared with the size of the bird that laid them. It is claimed by most authorities that under favorable conditions two broods are raised each season.

The Anna's Hummingbird of our illustration is one of the most striking of those best known. It is perhaps the most beautiful of the species that frequent the United States. It is a native of California and in its migrations passes southward through Arizona to the tablelands of Mexico. It is also found in Lower California.

The head and ruff of the male have a lustrous metallic purplish red color. The female is bronze green above, though the top of the head is sometimes brownish, showing but little if any metallic luster. Both sexes vary somewhat in color. This is especially true of the males, some individuals having more purplish red on the crown and throat than others.

This species inhabits a metal producing region and it is an interesting fact, as cited by Mr. Gould in his "Monograph of the Hummingbirds," that "those districts or countries having a metalliferous character are tenanted by species of

hummingbirds which are more than ordinarily brilliant and glittering."

Major Charles Bendire in his "Life Histories of North American Birds," records an interesting observation of Mr. A. W. Anthony regarding the hatching of an Anna's Hummingbird. These words probably well describe the process followed by all the species.

Writing in regard to a set of eggs which he had collected, he says: "I was somewhat disgusted to find one of the eggs pipped and, realizing the difficulty of making a presentable specimen of it, was on the point of throwing it away when a movement on the part of the tiny creature within the shell suggested to my mind that I hatch the egg and find out for myself how baby hummingbirds come into the world. So far there was but a pin point broken, the rest of the shell being intact; and it was several minutes before the warmth of my hand, aided by my breath, produced another movement upon the part of the prospective hummer; first a feeble struggle, followed by an interval of rest; another squirm and the point of the bill came in view and was withdrawn; after a moment's rest a new system was adopted, which consisted of turning around in the shell from right to left and cutting a clean, smooth opening with the sharp, horny tip on the upper mandible; this

operation was evidently hard work and required all the strength of the little mite, and frequent rests were necessary to recruit. Sometimes an interval of twisting seemed to accomplish nothing, and it would look as if all its struggles would be in vain. I wondered whether the parent would not render a little much-needed assistance at this stage; but after an interval of rest the work would be continued with renewed vigor and another millimetre cut toward the outer world. The cutting was all done in the same direction. When the shell had been cut four-fifths around, the chick succeeded in getting one claw hooked over the edge of the break, and by one or two vigorous pushes broke the remaining shell, leaving in my hand two nearly equal parts of what had been a hummingbird's egg and a squirming something that bore no semblance whatever to one of the peerless members of the genus *Calypte*." The entire operation, which added another individual to America's beautiful family of birds, required but fifteen minutes of time. The energy and perseverance of the little mass of flesh was a hint of that pugnacious disposition that would be so striking a characteristic when it became fully grown and clothed with its resplendent metallic plumage.

LONGING.

O, for the woods and fields and streams,
For flowers wild and squirrels shy—
For birds whose sunlit plumage gleams,
For sight of clear, unhidden sky!

For grasses green, for springs and marsh,
For mountain paths and tramps o'er hills
Where nothing sinful—nothing harsh—
The sweetening song of Nature stills!

Lloyd Thompson.

EXPERIENCES WITH "HUMMERS."

Did you ever hold a live hummingbird in your hand? Well, I have held several of the wee, wee creatures. Did you ever look into a hummingbird's nest? Well, I have peeped into several of the tiny, downy affairs.

Two of the nests contained eggs; one contained young birds. The eggs were as small as an ordinary garden pea—perfectly egg-shaped. Can I describe the young of the hummingbird? No, impossible. I can only say that they are the smallest animal I ever saw in all my life. Of course, that does not include the insect world.

How did I contrive to get hold of a live hummingbird? Easy enough when you know how.

One hot afternoon in June I was sitting in a garden reading. A few yards away stood a large bunch of brilliant carnations. Now, if there is anything which a hummer fairly dotes on it is pinks. Suddenly I heard a loud hum near by. I looked toward the carnations, and, sure enough, there were too hummingbirds hovering around the flowers.

I watched their movements for several moments with great interest. Presently I observed that one of the birds appeared to be entangled. Its tongue, or long, needle-like beak, was caught in some manner in the petals of a large pink. The little fellow kept fluttering around in a helpless way, but could not liberate itself.

Instantly I dropped the book and ran over to the bed. The other hummingbird darted away like a shot. I very softly took the tiny prisoner in my hand and then gently liberated it. For half a minute or more I held the trembling, fluttering creature in my hand. I wish I could describe the beauty and brilliancy of its plumage. Silk, velvet and the delicate tints of the rainbow are the only adequate words. Finally I released the prisoner. In a flash he was out of sight.

One good fright was enough. Neither bird ever came back to the carnations again. At least, the pinks were not visited by any more hummingbirds that season.

Last summer I was out with a fishing party. We went far back into the mountains, where it was rugged, wild and lonely. One day I was out fishing along a rushing torrent. There was a deep, swirling eddy where I was angling, and just on the bank stood a small cedar tree. A long, slender limb hung only a few feet above my head.

While I was fishing a hummingbird came buzzing around my head. It kept circling around me for some time. Finally I stopped fishing. Instantly the bird alighted on a twig and eyed me closely with its bright bead-like eye. A moment later the little mate arrived.

"Surely there must be a nest near by," I said to myself. Then I began fishing.

Both birds immediately came whirring about my ears like two hornets. They kept it up until I desisted. Then both alighted and watched me sharply. Again and again I tried to fish, but the little creatures would give me no peace.

Down I laid my rod and began to look carefully for a nest. Sure enough, there was one concealed amidst the cedar boughs. It was right above my head where I stood fishing. Very gently I pulled the pendent branch down until I could peep into the thimble of a nest, which contained beautiful eggs. Meantime the birds kept buzzing around my head in a most distracted manner.

Having satisfied my curiosity I quietly withdrew, to the evident delight of the little parents.

On another occasion I was out in an orchard. I noticed two hummingbirds flying around a certain apple tree limb. As I approached the birds became more excited. When within a few yards of the

tree I noticed a young bird sitting on a nest. He was almost grown. Not wishing to frighten the little chap, I stopped abruptly. But he darted away. However, his wings were too weak, and down he sank fluttering, falling into a big tuft of tall grass.

He was perfectly helpless, so I very tenderly picked him up and placed him back on the nest. To my surprise and amusement he did not attempt to escape, but stood up boldly and looked at me in a saucy, defiant way. The parent birds were buzzing around me like angry bees, but when they saw that I did not harm their offspring they both alighted near the nest.

A large clump of wild currants stood in one corner of the yard. I noticed two hummingbirds almost constantly hovering around the bush among the large yellow flowers.

I went out one afternoon and secreted myself in the clump, in order to observe more closely the actions and peculiarities of the birds. One was the largest hum-

mingbird I had ever seen, and its plumage was simply gorgeous.

Soon the birds came around, but they did not seem in the least alarmed by my presence. The larger one came very near, and actually flew against my face. I held up my hand, when the bird flew straight into it. I instantly closed my fingers and held him a prisoner. His plumage was brilliant beyond description. As the beautiful captive did not seem to resent my familiarity, I examined his coat carefully before giving the bird its freedom.

I had still another experience with a hummer. On a bright summer day one flew through an open door into a room where I was sitting. Quick as a flash the bird discovered its mistake. It dashed against a window pane with all its might and dropped on the floor. I hastily picked it up. It seemed quite dead. But as I held it in my open hand, silently sympathizing over its fate, the bird suddenly revived and flitted out through the open door before I could wink.

J. MAYNE BALTIMORE.

MY HUMMINGBIRD.

No other fairy did I see
So graceful, pulsing, in the air,
As if the heart of nature beat
Its throbbings in the birdlet there.

The gray, the green, the dash of red,
The beating wings that gauzy seem—
So rapid the vibrating hum—
I almost dream were but a dream.

Then suddenly I cry aloud,
When in a rapid-shooting ray,
My fairy disappears, a-flash,
Into the sun-haunts far away.

Willis Edwin Hurd.

LIBRARY
UNIVERSITY OF ILLINOIS



THE RUFOUS HUMMINGBIRD.

(*Selasphorus rufus*.)

This hardy little "Hummer," which is even smaller than our well-known ruby-throated hummingbird, is weighted with a number of popular names. Among these are the "Rufous-backed Hummingbird," the "Ruff-necked Honeysucker, or Hummingbird," the "Rufous Flame-bearer" and the "Cinnamon Hummer."

The Rufous is probably the most widely distributed of all the hummingbirds. Its range extends throughout Western North America. It breeds from the higher mountains of Southern California northward, near the coast to Nootka Sound, Alaska. In its migrations it flies eastward to Montana, Colorado and thence southward through New Mexico to Western Texas. In fact, during this period it frequents the eastern slopes of the Rocky Mountains, adding beauty to this wild region. Its winter home is chiefly in Mexico and Lower California.

This Hummingbird is exceedingly pugnacious and, as Mr. Henshaw says, "The fiery red throat of the Rufous-backed Hummer is an index of impetuous, aggressive disposition, and when brought into conflict with the other species it invariably asserts its supremacy and drives its rival in utter rout from the field. Nor do the males of this species confine their warfare to their own sex. Gallantry has no place apparently in their breasts, and when conquest has put them in possession of a perch near a clump of flowers they wage war on all comers, females as well as males."

The Rufous Hummer is one of the earliest of the migratory birds to leave its winter home, and arrives within the borders of the United States early in March and is known to begin housekeeping as far North as the State of Oregon early in April. Altitude as well as climate seems to have much influence in the selection of a nesting sight. The altitude of the breeding range seems to lie between four and seven thousand feet above the sea level, and nests have been reported as high as ten thousand feet.

Mr. A. W. Anthony, writing of this species as he observed it in Oregon, says that "they nested to some extent in oaks, blackberry vines and on dry roots projecting from upturned trees. One nest hung from the end of a tall fern, while others, drooping over it from above, hid the beautiful structure from all but accidental discovery. Their favorite sites, however, seemed to be the long, trailing vines overhanging embankments and upturned trees. A number were found in railroad cuts. One nest was found that had been placed on top of a last year's habitation, a mere rim being built to raise the sides, and a flooring being added to cover up a large pebble that could be plainly felt under the cotton lining." This habit of adding stories to nests of the previous season is not infrequent with other species of the hummingbirds.

The nest of the Rufous Hummingbird resembles those of many other species of hummers, and it is very much like that of the Anna's hummingbird. The framework is composed of delicate tree mosses and fine bark fiber, the outer face of which is sometimes adorned with lichens, though not so profusely as is that of the Anna's, and fastened together with spider's webs and the silky threads from cocoons. It is lined with the fine cotton down of plants, especially that of the willow, and the pappus of the Compositae. These nests seem large when compared with the size of the bird. The average nest measures about one and one-half inches in the outer diameter and one and one-fourth inches in depth. "Their nesting sites may be looked for in low bushes as well as on the horizontal limbs of trees at various distances from the ground." When compared with other species of the family this species is quite noisy, especially when it sees a broad-tailed hummer in the neighborhood. For this species it exhibits an intense animosity and will pursue it, uttering shrill and expressively angry notes.

WHAT A LITTLE MOUSE SAID.

I am only a little mouse; my name is Wee Wee.

I live in a big house away out in California. My mother has made a very cozy home for us between the walls where it is nice and dark. We do not mind the dark, you know, for we can see even better then, with our little bright eyes.

Our bed is soft and warm and is made of tiny bits of paper which we children helped our mother to tear up and it is lined with some nice soft cotton which she picked out of a comforter one night when every-one had gone to church.

We have never been out very much but now, our mother says, we are big enough to help get the living. When she told us this, we all said: "Squeak, squeak, squeak," which, in mouse language, meant that we were glad and thought it would be fine fun to leave our nest and go out into the big world.

But mother said: "Children, before you go I want to tell you something; listen well to what I shall say."

And so we six little mice sat very solemnly in a row, on our hind legs and pricked up our ears and listened quietly while she went on. "You go through a narrow passage till you come to a little round hole and when you have squeezed through this you will find yourself in a big room called a kitchen. You must then run quickly across the floor and into the door of a bathroom. There is also a hole behind the bathroom door which you may need to jump into if anything happens. Next comes a nice, large pantry and in there you will find everything that we mice like to eat. Bring what you can carry, after you have eaten all you can, but do not eat too much or you will never be able to squeeze through the hole again. Now you must never go in the daytime, but wait until night."

After telling us this, my mother left the nest saying that she was going to call on one of our neighbors who lived in an old felt hat, very near us. She said she might be gone some time, so, while my

brothers and sisters were taking a nap, I thought to myself: "I don't see why mother told me not to go in daylight. I am sure everything seems perfectly quiet now and I don't think anything could hurt me; and I do feel so hungry. I guess I will go on a little trip, and 'we shall see what we shall see.'" With that I crept out of the nest without making the least bit of noise and followed the directions my mother had given me.

Soon I found myself in the pantry and O! how good everything did smell. I found some cheese and I ate a very big hole in a white cake with icing on it and was just thinking what I could carry home as a surprise for the children when I heard a rushing noise like the patter of feet and I jumped behind some glass jars that were on the floor in the corner.

To my horror I saw very near me, for I could see right through the glass jar, a funny thing with long white wool and sharp teeth, a long, pointed nose and a terrible big red tongue hanging out of its mouth and little sharp black eyes that seemed to be looking clear through me. Oh! how I trembled and oh! how I wished then that I had obeyed my mother.

I saw now, when it was too late, that she knew best. Just then a big giant with dresses on came into the pantry and I heard her say: "That dog thinks there is a mouse in here." So it was a dog and I remembered now that my mother had said one day that there was a spitz dog in that house.

The lady went out but the dog smelled me and was determined not to give me up so he ran to the big giant with dresses on and whined and whined until she came in again and said: "Well, Zip, I guess there must be a mouse here since you insist on it." So she went out and got a long stick with a lot of straws on the end of it (she called it a broom), and with that she poked around all over the pantry, and the funny thing with long, white wool and sharp teeth kept smelling around and

clawing at the glass jars till I thought I should die of fright. "It must be behind those jars, the way Zip acts," she said; and she took the broom and knocked over all the jars with a crash. Well! I thought my time had surely come. My eyes filled with tears and my heart almost broke as I thought of my dear mother and all my sisters and brothers so happy at home.

But just in that terrible moment I happened to remember what my mother had said about running into that other hole in case anything should happen, so with one bound I was on the floor and the funny thing with long, white wool and sharp teeth made a grab for me. I could

feel his hot breath close upon me and I could almost feel his sharp teeth when I heard the big giant with dresses on say: "Catch him, Zip."

But surely a kind fate must have been with me for I was too quick for them. I never ran so fast in my life. I fairly flew till I found the hole behind the door and jumped in and ran along till I found myself once more at home, where all the family were frightened almost to death at my absence.

After that terrible experience I shall always do what my mother tells me to, for after all, she knows best.

Jessie Juliet Knox.

ABOUT A SPARROW.

There have been tales told about this curious little rowdy among birds. He was a nuisance; he drove our song and grub-eating birds away; he also littered the cornices of buildings and made of himself a pest in general. There have been other tales told about the cute chap who perches upon a wire near the window and rocks his clever head toward you when you tap against the pane; and still another story is told concerning the lynching of one by a flock of the brisk chaps. Some say they took a bit of twine, fastened it to a wire, secured the victim, and induced him to put his head through a loop; then drew the twine and scattered, leaving a lot of wise men to gaze upon the wonderful spectacle, which the newspapers took up and printed. I have watched birds for years and I never saw an incident of the sort—the lynching of a sparrow by his fellow sparrows! A sparrow has been caught in the loop of a bit of twine fastened to a wire or a cornice; but no sparrow ever deliberately put the twine up and lynched one of his rowdy brood. He wouldn't do it simply because he hasn't got bird instinct enough to follow out such a tragedy. I will tell you a little incident concerning a sparrow which I know to be true. It didn't find a place in any newspaper, either, simply

because I never gave it much thought until now, hence never mentioned it before.

I had noticed upon arising for several mornings in the early spring a half dozen or so of sparrows congregated in a sunny spot of the roof below. At first I paid no attention to it, for the sparrow is apt to go where he pleases, man's wishes to the contrary notwithstanding. But the little chaps were there every morning, and in the same sunny spot. I was curious to know why they came there, and I went down stairs one morning to watch them from a more close point of observation. I got there before they came. I stood back of a closed blind, peeped through the slats and waited. When the sun-rays fell upon the spot close to the window the little fellows began to come—each with a morsel of food. They twittered and hopped about as if they were enjoying the morning fancy. Then they scattered and took wings to chimneys, cornices and wires. I opened the blinds and looked out. I saw one lone, little sparrow feeding. I bent over the sill. He did not fly away. I reached out and took him in. He fluttered and struggled. His eyes were covered with a film. He was blind.

H. S. KELLER.

THE WHITE-THROATED SPARROW.

(*Zonotrichia albicollis*.)

"The sparrows are all meek and lowly birds." They are not clothed in a plumage of gorgeous hues, but are endowed with melodious voices in harmony with their surroundings. "Theirs are the quaint lullaby songs of childhood." Their plain coats are a means of protection, for they frequent the fields, the hedges and the low shrubs of the woodland borders. Some of their relatives, the grosbeaks, the goldfinch and the finches, are more brilliantly colored and are more arboreal in their habits.

The White-throated Sparrow (*Zonotrichia albicollis*) is one of the handsomest of the sparrows. It is one of the exquisite parts of nature. Migratory in habits, its range covers all of Eastern North America, nesting from Michigan and Massachusetts northward and wintering from the latter state southward to Florida.

Its scientific name is descriptive of the marked color characteristics of its crown and throat. *Zonotrichia* means hair or crown bands, and *albicollis* is from the Latin meaning white-throated. It is sometimes called Peabody Bird, especially by the New Englanders, with whom Peabody is an important traditional name, and they hear the birds say in its song "I—I Pea-body, Pea-body, Pea-body." This rendering of its plaintive song is a caricature, yet the name clings to the bird even in other parts of the country. The reserved manner of its movements would hardly lead one to expect that a beautiful song could flow from its white throat. This song is so well defined that the notation may be written on the musical staff. Mr. Chapman says: "In September, when the hedgerows and woodland undergrowths begin to rustle with sparrows, juncos and towhees, I watch eagerly for the arrival of these welcome fall songsters." We cannot forbear quoting the words of that great student of bird life, Audu-

bon, who says of the White-Throat's habit in autumn, "How it comes and how it departs are quite unknown to me. I can only say that, all of a sudden, the edges of the fields bordering on creeks or swampy places and overgrown with different species of vines, sumac bushes, briars and the taller kinds of grasses, appear covered with birds. They form groups, sometimes containing from thirty to fifty individuals, and live together in harmony. They are constantly moving up and down among these recesses, with frequent jerkings of the tail, and uttering a note common to the tribe. From the hedges and thickets they issue one by one, in quick succession, and ramble to the distance of eight or ten yards, hopping and scratching, in quest of small seeds, and preserving the utmost silence. When the least noise is heard or alarm given, and frequently, as I thought, without any alarm at all, they all fly back to their covert, pushing directly into the thickest part of it. A moment elapses, when they become reassured, and ascending to the highest branches and twigs open a little concert, which, although of short duration, is extremely sweet. There is much plaintive softness in their note, which I wish, kind reader, I could describe to you; but this is impossible, although it is yet ringing in my ears, as if I were in those very fields where I have so often listened to it with delight. No sooner is their music over than they return to the field, and thus continue alternately sallying forth and retreating during the greater part of the day. At the approach of night they utter a sharper note, consisting of a single twit, repeated in a smart succession by the whole group, and continuing until the first hooting of some owl frightens them into silence. Yet, often during fine nights I have heard the little creatures emit, here and there, a twit, as if to assure each other that all's well."



LIBRARY
UNIVERSITY OF ALABAMA

The nest, too, is a neat creation of small roots, coarse grass, bark and moss and lined with a bedding of fine grass and moss. It is usually placed on the ground in fields or open woods, where it is protected by the taller grasses. Sometimes, however, low bushes or the lower branches of trees are selected.

So careful is the White-Throat in the constructing of its nest not to disturb the surrounding vegetation, and so neutral is the color of the material used, that one may hunt for a long time without finding it unless he luckily stumbles upon it.

A PLANT THAT MELTS ICE.

To say that a plant can melt ice is to assert a miracle seemingly too great for even Nature's powers to compass, but a traveler lately returned from the Alps has witnessed this wonderful phenomenon, while Grant Allen and other authorities confirm the fact that the Alpine Soldanella melts for its blossom a passage through the ice by power of its own internal heat.

The majority of tourists visit the Alps in August; therefore they miss a rare sight, that of a daring little shrub opening its fringed blue buds in the very middle of the snow sheet, and often showing its slender head above a layer of ice, in the most incredible fashion.

We may regard the Alps as unpeopled solitudes, but to Alpine plants they are a veritable world of competing life types.

Those only fitted for the struggle survive.

The botanists tell us that the Soldanella is heavily handicapped in the race. In the first place, it is obliged to eke out a livelihood in the mountain belt just below the snow line; further, it is a very low growing variety, and is quickly obscured and overtopped by the dense and rapid growth of its taller rivals; hence its anxiety to seize its one chance in life at the earliest possible moment.

To attain the end of its being, the per-

petuation of its species, it must steal a march upon its companions, as it were, and show itself while they are still locked in sleep, and when its insect fertilizers, fresh from their cocoons, can see and visit it.

To accomplish its purpose it has made ample preparations.

All through the previous summer its round leaves, admirably fitted to their purpose, have been spread to the mountain sun and gathered in the fuel to be burned later on.

When winter arrives the leaves had grown thick in rich material and so leathery that no amount of snow could injure them.

The first warmth of spring melting the edges of the snow sheet sends the moisture trickling down to the Soldanella's roots. This, acting upon them as water upon malting barley, brings about germination.

The plant, absorbing the oxygen in the air under the ice and combining it with the fuel in its own substance, **melts its** way into the open air. A fragile **flower** forcing its way through a solid **crust of** ice. Literally, not metaphorically, a slow combustion store.

This novel feat is accomplished **every** season, yet comparatively few observers note it.

LOUISE JAMISON.

THE HUMMINGBIRDS.

Maxime mirande in minimus!

Minutest of the feathered kind,
Possessing every charm combined,
Nature, in forming thee, designed
That thou shouldst be,
A proof within how little space
She can comprise such perfect grace,
Rendering the lovely, fairy race
Beauty's epitome.

—Charlotte Smith.

The discovery of

“The rare little bird of the bower,
Bird of the musical wing,”

being coincident with that of the New World, the ancients were denied the exhilarating shock of delight that has been vouchsafed to their descendants when that

“—Quick feathered spangled shot,
Rapid as thought from spot to spot,
Showing the fairy humming-bird.”

and their writings lack the glamour of his “glossy, varying dyes; for, according to Lesson, the first mention which is made of hummingbirds in the narratives of adventurers who proceeded to America, not with the design of studying its natural productions, but for the discovery of gold, dates from 1558.

Of the name hummingbird or humbird, Professor Newton says its earliest use, as yet discovered, is said to be by Thomas Morton in *The New England Canaan*, printed in 1632, while in 1646 Sir Thomas Browne wrote: “So have all Ages conceived, and most are still ready to swear, the Wren is the least of Birds, yet the discoveries of America, and even of our own Plantations, shewed us one farre lesse, that is the Hum-bird, not much exceeding a Beetle.” Mr. Ridgway cites the case of Mr. Benjamin Buttrick, writing from Boston in 1697, who told of a hum-bird that he fed with honey, that was “A Prospect to many Comers.”

“The earliest notice of the common Ruby-throat that I have been able to

find,” Mr. Ridgway continues, “is an extract from a letter written from Boston in New England, October 26, 1670, by John Winthrop, Esq., governor of Connecticut, to Francis Willoughby, Esq., and published in the philosophical Transactions.” This letter reads as follows:

“I send you withal, a little Box, with a Curiosity in it, which perhaps will be counted a trifle, yet 'tis rarely to be met with, even here. It is the curiously contrived nest of the Humming-Bird, so called from the humming noise it maketh as it flies. 'Tis an exceeding little Bird, and only seen in Summer, and mostly in gardens, flying from flower, sucking Honey out of the flowers as the Bee doth; as it flieth not lighting on the flower, but hovering over it, sucking with its long Bill a sweet substance. There are in the same Nest two of that Bird's eggs. Whether they used to have more at once I know not. I never saw but one of these Nests before, and that was sent over formerly with some other Rarities, but the vessel miscarrying, you received them not.”

Of the long bill with which it sucketh the sweet substance, the tongue is the essential feature, so far as sustenance is concerned; consisting of a long double cylinder, “like a double-barreled gun,” Goodrich thought—a most convenient instrument for imbibing nectar—flattened and sometimes barbed at the end, for the capture of the minute insects that constitute the less æsthetic portion of their nutriment—for it has been many times demonstrated that, airy and fairy as they

are (the size of the stomach not exceeding the globe of the eye, and scarcely a sixth part as large as the heart, which, in turn, is remarkably large, nearly the size of the cranium), they cannot live by ambrosia alone, nor yet by love, but must vary both with an occasional relish of aphides and infinitesimal spiders.

Of "that Bird's two eggs," Mr. Chapman says: "As far as known, all hummingbirds lay two white eggs—frail, pearly ellipses—that after ten days' incubation develop into a tangle of dark limbs and bodies, which no one could think of calling birds, much less winged gems."

It has been a matter of doubt to many whether hummingbirds ever rested at all or spent their lives in the air exclusively, but Mr. Gould states authoritatively: "Although many short intermissions of rest are taken during the day, the bird may be said to live in the air—an element in which it performs every kind of evolution with the utmost ease, frequently rising perpendicularly, flying backwards, pirouetting or dancing off, as it were."

It was the belief of the Duke of Argyle that no bird could fly backward, a theory that he stated with emphasis in his Reign of Law, but it has been proved that he reckoned without "the winglet of the fairy hummingbird," which seems to be the exception to prove a reigning law of Nature.

Montgomery makes of the whole Trochilidæ family this inspired explanation:

"Art thou a bird, a bee, or butterfly?
Each and all three;—a bird
A bee collecting sweets from bloom to bloom,
A butterfly in brilliancy of plume."

The blooms from which he collects his sweets are of the tubular flowers almost exclusively, as a mark, possibly, of his appreciation of their invention for him and at his request, as told by Albert Bigelow Paine:

"The clover, said the humming-bird,
Was fashioned for the bee,
But ne'er a flower, as I have heard,
Was ever made for me.

A passing zephyr paused, and stirred
Some moonlit drops of dew
To earth; and for the humming-bird
The honeysuckle grew."

Of his manner of hanging before his tubular flowers Goodrich says: "He poises or suspends himself on wing for the space of two or three seconds so steadily that his wings become invisible and you can plainly discern the pupil of his eye, looking round with great quickness and circumspection. The glossy green of his back and the fire of his throat, dazzling in the sun, form altogether a most interesting appearance."

This appearance Alexander Wilson pictures thus:

"While richest roses though in crimson drest,
Spring from the splendors of his gorgeous breast.

What heavenly tints in mingling radiance fly!
Each rapid movement gives a different dye;
Like scales of burnished gold they dazzling show,

Now sink to shade, now like a furnace glow!"

It is little wonder that Buffon exclaimed, "Nature has loaded it with all the gifts of which she has only given other birds a share!" Yet Mr. Ridgway considers the Count de Buffon's laudation as excessive because the "absence of melodious voice is, as a rule, a conspicuous deficiency of the tribe"; and in 1693 Mr. Hammersley of Coventry stated, "God, in many of his creatures, is bountiful, but not lavish, for I did observe the hummingbirds for several years, and never heard them sing."

Goldsmith says that all travelers agree that they have a little interrupted chirrup, but Labat asserts that they have a most pleasing melancholly melody in their voices, though small and proportioned to the organs that produce it.

It is known that a few of the more robust species of Jamaica and Mexico warble a pigmy melody, and Mr. Gosse says that the Vervain hummingbird of Jamaica is the only one known to him that has a real song, warbling in a very weak but very sweet tone a continuous melody for ten minutes at a time.

But the poet Rogers apprehended something more than is perceptible to the scientific consciousness, for he exclaims in *The Voyage of Columbus*:

"—There quivering rise
Wings that reflect the glow of evening skies!
Half bird, half fly, the fairy king of flowers
Reigns there, and revels through the fragrant
hours;
Gem full of life and joy and song divine!"

Could the compressed, intense, vehement little sprite be expanded to the dimensions of the ordinary folk of air, would the magnified musical and physical representation be as entrancing as are the fleeting glimpses of the fairy and the elusive hints of melody that so nearly escape us now?

For this electric spark, like an erratic meteorite of topaz and ruby and gold,

“As if inlaid

With brilliants from the mine, or made
Of tearless rainbows, such as span
Th’ unclouded skies of Peristan,”

hovering between heaven and earth in a mist created by its own prismatic wings, might almost be believed an exemplification of light itself as scientifically defined, “a form of radiant energy,” and it is the nearest approach to a disembodied spirit that lies within the range of mortal vision. So while it is believed that its song is but a feeble twittering, it may yet be as much musician as it is bird, and emit strains of melody too exquisite and finely drawn for human apprehension, and of which the notes that reach us are but the deeper tones of a delicate and ethereal arioso.

JULIETTE A. OWEN.

EACH IN ITS OWN WAY.

There's never a rose in all the world
But makes some green spray sweeter;
There's never a wind in all the sky
But makes some bird-wing fleeter;
There's never a star but brings to heaven
Some silver radiance tender;
And never a rosy cloud but helps
To crown the sunset splendor;
No robin but may thrill some heart
His dawnlight gladness voicing;
God gives us all some small, sweet way
To set the world rejoicing. —Selected.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



PARULA WARBLER.
(*Compsothlypis americana*).
Life-size.

THE PARULA WARBLER.

(*Compsothlypis americana*.)

Hither the busy birds shall flutter,
With the light timber for their nests,
And, pausing from their labor, utter
The morning sunshine in their breasts.

—James Russell Lowell.

The Parula or Blue Yellow-backed Warbler, as it is sometimes called, is one of the smallest and daintiest representatives of the family of wood warblers. Like the other species of warblers it is one of the last spring migrants to reach its Northern summer home. Retiring and unobtrusive in its habits, it is to be admired for its "plain and modest beauty." Though delicately colored, its plumage is not nearly so striking as that of many of the other species of the family. It enjoys the higher branches of its woodland retreat, and here it seeks its food. Graceful in all its motions, it flits from branch to branch; hanging by its feet, it peers under the leaves and along the twigs.

In the summer the Parula is a resident of Eastern North America, but in the winter it seeks the warmer climate of Florida and southward. While migrating it is well distributed over its range, and may frequently be seen flying from shrub to shrub. Like the other warblers its flights are short and most of the time it is hidden by the foliage. The longer flights are by night. The days are spent in seeking insects, upon which it feeds almost exclusively. This, the habit of all the warblers, explains the Parula's sudden disappearance from a locality where it may have been common for a single day.

Near the end of May it retires to the swampy woodlands where the gray Spanish moss hangs pendant from the branches and shrubs. Here the Parula makes its nest, a globular or pencil home, us-

ually in bunches of the festooned moss. The four or five white eggs are marked near the larger end with specks of light brown and lilac. Its song is neither interesting nor striking, but is peculiarly in harmony with the voices of spring and as Mr. Chapman says: "When the cypresses are enveloped in a haze of lace-like blossoms and the woods are fragrant with the delicious odor of yellow jasmine, the dreamy softness of the air is voiced by the Parula's drowsy song."

Neltje Blanchan has most charmingly written about this dainty bird. She says: "A number of such airy, tiny beauties flitting about among the blossoms of the shrubbery on a bright May morning and swaying on the slenderest branches with their inimitable grace, is a sight that the memory should retain into old age. They seem the very embodiment of life, joy, beauty, grace; of everything lovely that birds by any possibility could be. Apparently they are wafted about the garden; they fly with no more effort than a dainty lifting of the wings, as if to catch the breeze that seems to lift them as it might a bunch of thistledown. They go through a great variety of charming posturings as they hunt for their food upon the blossoms and tender, fresh twigs, now creeping like a nuthatch along the bark and peering into the crevices, now gracefully swaying and balancing like a goldfinch upon a slender, pendant stem. One little sprite pauses in its hunt for insects to raise its pretty head and trill a short and wiry song."

A DAINTY LOVER.

All animal life is wonderful and much of it is beautiful, but it seems to me there can be nothing prettier or more subtle in all the immense accumulation of the folk lore of human courtship and marriage than the following practice of a certain Mexican bird.

He belongs to a rarely beautiful species of the Paradise family.

To shield the privacy of his wooing and wedding he builds a dainty little cone-shaped hut, about which he con-

trives a marvelous little landscape garden.

First he makes a sward of green moss and beds and parterres of crimson berries, tiny bright flowers and gold and silver sand and grains. Here and there he puts a pearly pebble or tiny pink shell. And so long as his love making lasts he drags away and replaces each flower as it fades, keeping the little Eden tidy, gay and sweet for his tiny love.

This sounds like fiction, but is scientific fact. LOUISE JAMISON.

A BIRD NOTE.

Robin Feeding Young: Scene, the base of a large pine tree in the corner of a lawn; actors, a mother robin and two of her young.

I was much interested in their proceedings and watched them for some time. One of the young ones did not seem to understand matters very clearly and often failed to do what mother robin wished it to. The other one, however, was a very apt pupil, and did many bright things. Finally it began to gather food on its own account and succeeded in capturing sev-

eral worms, small butterflies, etc. But it did not stop here; it remembered its nest mate, and, following the example of the mother bird, collected food and placed it in the mouth of the less active learner. A very good example of how closely parents are imitated, in the bird world, as well as in the human subject.

The above incident as witnessed and recorded in the writer's note book, seem too good to be lost sight of, and I trust they may prove of interest to all.

Berton Mercer.

GOLDENROD.

As nature lifts her gates from week to week,
New beauties rise God's wondrous power to speak;
And now, clad in her glory as of old,
The Goldenrod uplifts her crowns of gold.

John Wesley Waite.

BALLADE.

I found myself one day all, all alone,
For pastime in a field with blossoms strewn.

I do not think the world a field could show
With herbs of perfume so surpassing rare;
But when I passed beyond the green hedge-row,
A thousand flowers around me flourished fair,
White, pied and crimson, in the summer air;
Among the which I heard a sweet bird's tone.

I found myself one day all, all alone,
For pastime in a field with blossoms strewn.

Her song it was so tender and so clear
That all the world listened with love; then I
With stealthy feet a-tiptoe drawing near,
Her golden head and golden wings could spy,
Her plumes that flashed like rubies 'neath the sky,
Her crystal beak and throat and bosom's zone.

I found myself one day all, all alone,
For pastime in a field with blossoms strewn.

Fain would I snare her, smit with mighty love;
But arrow-like she soared, and through the air
Fled to her nest upon the boughs above;
Wherefore to follow her is all my care,
For haply I might lure her by some snare
Forth from the woodland wild where she is flown.

I found myself one day all, all alone,
For pastime in a field with blossoms strewn.

Yea, I might spread some net or woven wile;
But since of singing she doth take such pleasure,
Without or other art or other guile
I seek to win her with a tuneful measure;
Therefore in singing spend all my leisure,
To make by singing this sweet bird my own.

I found myself one day all, all alone,
For pastime in a field with blossoms strewn.

—Angelo Poliziano, (1454-1494.)

TOURMALINE.

Early in the eighteenth century some children of Holland, playing on a warm summer's day in a court yard with a few bright colored stones, noticed that these possessed a strange power when warmed by the heat of the sun. They attracted and held (just as a magnet attracts iron) ashes, straws and bits of paper. On reporting this strange discovery to their parents the latter, it is said, could give no explanation of the curious property, but a relic of their knowledge of it is left in the name of "aschentreckers" or "ash-drawers" which they gave the stones and by which they were known for a long time.

Such was the method of introduction to the civilized world of the mineral now known as Tourmaline, a mineral which in variety of color, composition and properties is one of the most interesting in Nature.

The lapidaries who had given the Dutch children the stones for playthings did not recognize them as different from the other gems in which they were accustomed to deal. So to the present day, although Tourmaline is considerably used in jewelry, it is rarely ever called by that name. The green varieties are often known as Brazilian Emerald, Chrysolite or Peridot, some varieties of blue as Brazilian Sapphire, others as Indicolite, the colorless as Achroite, and the red as Rubellite, Siberite, and even as Ruby.

It is only somewhat recently that these different stones have been recognized as being varieties of a single mineral species which is known by the name Tourmaline. This name comes from a Cingalese word (turamali) which was applied to the first Tourmaline gems sent from Ceylon to Holland.

At one time the name Schorl was chiefly applied to the species. This was before the means of distinguishing mineral species were as well understood as

they are now, and a large number of minerals and even rocks were included under the name Schorl. One by one, however, they were distinguished by separate names until Schorl included only Tourmaline, and shortly afterward the name Schorl was dropped altogether.

In its opaque form, colored either black or brown, Tourmaline is a comparatively common mineral. It accompanies many so-called metamorphic rocks, i. e., rocks which have been changed by heat and pressure from their original condition, and is also common in granite and other eruptive rocks. As a rock forming mineral it often occurs as long, slender prisms, frequently about the size of a darning needle and radiating in all directions. The only mineral for which it is likely to be mistaken in this form is Hornblende. It can be distinguished from this in the following manner: On fusing the powdered mineral with a mixture of bisulphate of potash and fluor spar (best done on a little loop of platinum wire) Tourmaline will color the flame green, while Hornblende will produce no coloration.

The black opaque crystals often reach a large size, as some are known to be four feet in length. Both black and brown Tourmaline are usually opaque, and hence have no value as gems. The Tourmalines available for gems are transparent and have a great variety of color.

The gem Tourmalines are to be found in only a few localities. They occur in Maine, Connecticut and California in our own country, and also in Brazil, Russia and Ceylon. The crystals are usually in the form of long, slender prisms. They often have the peculiarity of being differently colored in different portions. Thus a crystal may be green at one end and red at the other, and in cross section may show a blue center, then a colorless zone, then one of red and then one of green.



TOURMALINE.

Green Tourmaline (Brazil).
Green Tourmaline (Haddam, Conn.)
Cross Section of Green Tourmaline (Cal.)

Red Tourmaline or Rubellite (Island of Elba).
Brown Tourmaline (Gouverneur, N. Y.)
Red Tourmaline or Rubellite in Lepidolite (Cal.)

Black Tourmaline (Finland).

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

Some of the crystals from Paris, Me., change from white at one termination to emerald green, then light green, then pink, and finally are colorless at the other termination. In some crystals again the red passes to blue, the blue to green and the green to black.

Exactly what produces these differences of color is not known. It is known that black Tourmaline has an excess of iron, the red and green an excess of sodium and lithium, and the yellow and brown an excess of magnesium in their composition. These same differences of composition characterize similar colors in portions of the same crystal as well as separate crystals. Hence the evidence is quite conclusive that the color in some way depends on the composition. Many transparent Tourmalines, while appearing of a uniform color when viewed in any one direction, exhibit different colors when viewed in different directions. Thus, one of the long, slender crystals may appear green when held lengthwise in front of the eye, but when looked at from the end appears brown. Again, some crystals appear perfectly transparent when viewed perpendicularly to the sides of the prism, but when viewed from the end are perfectly opaque. This may be true even when the thickness is less in the latter direction. Both these properties are due to the arrangement of the molecules of Tourmaline, which is such as to make the power of absorbing light different in different directions.

The form of crystals of Tourmaline is usually that of a three-sided prism. The sides of the prism are usually marked by narrow parallel lines called striæ, and the prism may be more or less rounded by the addition of other planes.

If a doubly terminated crystal be examined carefully, it will be seen that the planes on the two ends are not alike, either in number or inclination. On one end there may be three planes, on the other six, or even twelve. If the planes on one end make a blunt termination, those on the other may make a sharply pointed one. Such a peculiarity of crystal form is possessed by but few minerals. Those possessing it are said to be hemimorphic, i. e., half formed. In such minerals it is evident that the forces of attraction by

which the molecules were arranged differed in character at one end from those at the other. In other words, a separation of the molecular forces seems to have taken place, one kind going to one end and the other force to the opposite end. Now, it is a curious fact that most crystals which exhibit this peculiarity of form are also pyroelectric, i. e., become electric on heating. It was this development of electricity which caused the stones with which the Dutch children played, to pick up ashes, paper, etc., when the stones were warmed by the heat of the sun. Anyone can repeat their observation by gently heating crystals or even fragments of Tourmaline and applying them to bits of paper. The electrical attraction will often be found to be very strong, though it varies with different crystals. The fragments should not be overheated, the electricity being most strongly developed between 100 and 200 degrees Fahrenheit. A study of the kinds of electricity developed by the heat shows that positive electricity is produced at one end and negative at the other. Now, this exactly corresponds with what we have seen of the form of the crystal, and shows that the polar arrangement of the molecules producing different shapes at the two ends, also produces corresponding electrical properties. Crystal form, heat, electricity, and even light, are therefore seen to have intimate connection, and it may be that this interesting mineral will furnish us a means of learning more about these forces.

In composition Tourmaline is a complex silicate chiefly of aluminum and boron. Iron, magnesium, the alkalis, and water also enter in varying amounts into it. In fact, so complicated is its chemical nature that perhaps no other mineral has been so often analyzed or had its analyses so much discussed.

Ruskin, in his "Ethics of the Dust," thus describes its composition: "A little of everything; there's always flint and clay and magnesia in it; and the black is iron according to its fancy; and there's boracic acid, if you know what that is, and if you don't, I cannot tell you to-day, and it doesn't signify; and there's potash and soda, and, on the whole, the chemistry of it is more like a mediæval

doctor's prescription than the making of a respectable mineral."

As to its hardness and specific gravity, Tourmaline may be said to be both harder and heavier than quartz, its hardness being 7-7.5 in the scale of hardness of which the diamond is 10. Its specific gravity is 2.98-3.20. These qualities fit it admirably for use as a gem. It is, however, quite brittle and even at times friable. Cracks therefore frequently cut across good crystals and spoil what would otherwise make a good gem. It is very common to find tourmalines in the rocks broken into a number of pieces and the fragments "mended" together with quartz or calcite. This has been true of the black Tourmaline shown in the accompanying plate. Scarcely any other mineral exhibits this change so often as Tourmaline, a result due probably to its brittleness and the character of the rock in which it occurs.

I have shown how one of the most remarkable properties of Tourmaline was discovered by children. It is also interesting to know that the locality of the finest Tourmalines in the world was discovered by two boys named Elijah L. Hamlin and Ezekiel Holmes. They were interested in the study of minerals and spent much of their leisure time searching for them. One day in the fall, having been out many hours hunting for new minerals, they were about to return home when a gleam of something green at the roots of a tree caught their eye. Eagerly bringing it to light, they found it to be a beautiful green Tourmaline. A fall of snow that night prevented their obtaining more of the crystals, but the following spring they returned and secured many fine gems. For many years thereafter the locality furnished gems of purest ray serene which have gone to

adorn the coronets of kings and enriched the mineral cabinets of the world.

It is estimated that fifty thousand dollars' worth of Tourmalines have been taken from this one locality. Auburn and Rumford, Me., are two other neighboring localities where good gems have been found. At Haddam Neck, Conn., fine transparent Tourmalines occur, generally green in color, and many of them of gem quality. They occur in a granite rock.

The red Tourmaline (Rubellite) from California, illustrated in the accompanying plate, is found in San Diego County of that State. The matrix in which it occurs is a lithia-bearing mica (lepidolite) of a delicate violet color. In this matrix the Tourmaline usually occurs in radiating masses. The rose color of the Tourmaline contrasting with the violet of the lepidolite makes an object which is quite a favorite with mineral fanciers, although the former is not sufficiently transparent to be used as a gem. At two other localities in the same State large transparent Tourmalines of varying colors have been found.

The Brazilian Tourmalines are chiefly green in color. They occur in connection with blue and white topaz. They are the source of the gem known as Brazilian Emerald, which has not, however, the value of the true emerald.

The Tourmalines from the island of Elba are generally red in color, transparent and well crystallized. They are, however, too small to use as gems.

The Ceylon Tourmalines occur in the gem gravels of that locality accompanying rubies, sapphires, etc., while those of Russia, chiefly red in color, come from the Ural Mountains, being found in company with amethyst, topaz, beryl and other gems.

OLIVER CUMMINGS FARRINGTON.

THE STAR FISH.

One of the most common objects found along our New England sea coast is the star fish, called by the seamen "Five-fingered Jack." The fact of its being common does not at all imply that its habits are commonly known. The great difficulty of watching it in its native haunts has been a drawback to getting better acquainted with it, but when taken to an aquarium it has been found to be an exceedingly interesting little star. At low tide you may find hundreds of them clinging to the rocks, sea moss or on the sandy bottom, but they prefer deep water. Their color varies from a dark rich brown to a reddish, and often a chocolate shade, sometimes lighter; but no matter the shade, they are always attractive.

The upper side is slightly convex, rough and tuberculous; the under side is soft and contains all the vital and locomotory organs. Immediately upon being taken from the water the soft under parts seem to shrink away and nothing substantial remains but the upper surface. This is perforated with pores, through which the water enters to all parts of the body by channels. Very near the center is a small opening through which the water is admitted to a strong, rather elastic, tube, which is encircled by a series of rings. Now turn the star fish over and you can see that this tube opens into a ring about the mouth, while similar tubes stretch out to the arms. From these cross tubes little fibers extend, terminating in discs. These are the true organs of locomotion, and are called ambulacra. They move very slowly and are not at all clumsy, but have even been called graceful by some naturalists.

A portion of these ambulacra are made fast by suction while the rest of the body is drawn forward; then the first are relaxed and the process repeated, thus they travel in the deep waters.

It is quite evident that the five bright red eyes at the tip of each ray are of some use in helping them on their journeys; but just how much they can see is

not quite known. When a large object appears before them they prepare to surmount it, often going up very steep sides and down again as easily as though on a level stretch, often standing on the tip of one ray and sometimes on the five, thus resembling a five-legged stool.

The heart, situated near the opening on the back, is supplied with a set of blood vessels. They also have respiratory organs and a nervous system, but, judging from the manner they endure vivisection, their nervous system must be of a very low order, for if they are broken in pieces the missing parts will soon grow again—in fact, they do not seem to be disturbed in the least no more than if it were a cast-off garment, and evidently go about as happy with the remaining rays as with the complete body, and, what is still more strange, the broken ray will grow a complete set of arms and a new body. This is one way of reproduction, so if you wish to kill a star fish don't break it in pieces. The only sure way of making an end to their lives is to drop them in fresh water, when they immediately die.

It is very interesting to watch them care for their eggs. These are kept in pouches at the base of the rays, and when emitted through an opening there provided, are actually brooded as a hen her chicks, by arching the central part of the body and bending the rays down, and if the eggs are scattered they take great pains to collect them again, often traveling long distances for them.

The star fish consumes a large amount of food; you would hardly think one stomach could care for so much, but each ray has an additional stomach, and all need food. Their favorite food is the whelk, a small black-shelled, snail-like mollusk. Indeed, they eat many varieties of the mollusk.

They are also very fond of oysters. You would be interested to watch the star fish as he slowly works his way along until directly over the oyster, then folds his five arms around it, holding it

firmly in place, then pushing out his stomach, through his mouth, he wraps it around the unfortunate oyster, and by the power of suction the oyster is drawn from the shell and digested and the shell cast away. You can easily see what a nuisance they must be in an oyster bed.

They are known as the opossum of the sea, as they often appear to be quite dead when they are very much alive. If you

wish to be sure, put him on his back, and if alive you will soon see a number of semitransparent globular objects beginning to move, reaching this way and that. These are the ambulacra seeking to regain their normal position. If you see no motion, you may safely conclude that he is an extinguished star.

REST H. METCALF.

IN THE MEADOW.

A butterfly with spangles gay,
Met a bumble bee, one day,
Where the sunshine warmly lay
Turning clover into hay.

"Hark!" said lovely Shining Wings,
"Hear how loud that blackbird sings!
Don't you think the summer brings
Just the brightest, sweetest things?"

"See the color of the sky;
See the clouds that sail so high;
See the milkweed floating by"—
Said the dainty butterfly.

"Smell the clover blossoms there,
Scenting all the summer air;
Nothing half so sweet or fair,
As this meadow, anywhere!"

Bumble jerked his little head,
Then he rather crossly said:
"Well, I like the clover red,
Not for perfume, but for bread!"

"All the world knows that a bee
Much too busy is to see
Beauty merely. All that he
Cares for is utility."

Shining Wings then made reply:
"Though I'm but a butterfly,
Beauty's faithful lover I,
And without it fain to die.

"Life itself is naught, poor bee,
It it's but utility;
Sure am I 'twas meant that we
Should the beauty, also, see;

"Else there were no summer sky,
Nor the clouds to sail on high;
Else no milkweed floating by,
Nor spangles for the butterfly!"

Angry Bumble flew away,
Leaving Shining Wings to stay
Where the sunshine warmly lay,
Turning clover into hay.

Sarah E. Sprague.

LIBRARY
UNIVERSITY OF ILLINOIS
CHAMPAIGN, ILL.



INDIAN OR ASIATIC ELEPHANT.
(*Elephas asiaticus*).

THE INDIAN ELEPHANT.

(*Elephas indicus*.)

The Indian Elephant (*Elephas indicus*) inhabits the wooded parts of Southern Asia from the Himalayas to the Indian Ocean, and is found throughout Burmah, Siam and the Malay Peninsula. It differs from the African Elephant in having much smaller ears, a concave instead of convex forehead, smaller tusks, and in the possession of a finger on the end of the proboscis which, working against a tubercle on the lower part of the trunk, serves many of the purposes of the human hand.

The proboscis, which is an extension and enlargement of the nose and upper lip, is composed of as many as forty thousand interlacing muscles, and is capable of the most delicate and varied manipulation. At times it is used to strip twigs and leaves from overhanging trees, or again to uproot bamboo shoots or to pluck grass and plants from the ground, carrying all to the ever-grinding jaws behind. By sucking it full of water the Elephant may give himself a shower bath or squirt water into his mouth or even over people who offend him.

The presence of the trunk and tusks has greatly modified the cranium of the Elephant. Although a very intelligent animal, his brain is relatively small in proportion to his immense size. The great, rounded humps which crown an Elephant's head are composed of bony air cells, and their function is to provide surface for the supporting muscles of the trunk. So thick are these bony processes that they will stop a rifle ball; and on the other hand Elephants have been shot through the skull without the least injury to the brain.

The tusks, which are often lacking in Asiatic Elephants, especially in the females, are the incisors of the upper jaw, grown straight out, and serve primarily as weapons, although in domesticated animals they are used to dig and lift and to carry heavy burdens. Besides these teeth the Elephant has four large molars,

two in each jaw, and he is able to chew from four to eight hundred pounds of green fodder a day with them. In a wild state the Elephants wander about in bands through the forests, following their leader from feeding grounds to water, and concern themselves largely with eating and drinking and escaping from their enemies. The young weigh about two hundred pounds at birth, and attain to over eight thousand pounds at thirty years, when they have reached maturity. At sixty an Elephant is counted in his prime, and many live to be a hundred or even a hundred and fifty years old. Eleven feet is the extreme height of the Asiatic Elephant. His specific gravity is so great that in swimming rivers his whole body disappears below the surface; but this gives him no trouble, as he breathes by thrusting the tip of his trunk above the water and can surge up enough to get one eye out when he wishes to see where he is going.

The eyes are small and, probably on account of living in the forest so much, they are not very sharp-sighted. This defect is counterbalanced by very acute hearing and sense of smell. In browsing the Elephant is probably guided altogether by touch and his sense of smell; and in a dark forest even very sharp eyes are of little value either in selecting food or detecting enemies, especially in an animal with so short and heavy a neck.

The feet of an Elephant are great elastic cushions with which he passes noiselessly through the jungles. When he chooses to stand still it is almost impossible to distinguish his brown skin from the foliage with which he is surrounded. But an animal as large and strong as the Elephant does not need to conceal himself, except from man, his great enemy, and when a troop of Elephants wish to pass from one place to another they often charge through the jungles and forest, smashing down trees and vines and leaving a broad trail behind

them. When disturbed or wounded by hunters they rush furiously through the thickets after their tormentors, and if they fail to catch and crush them in the first charge it has often happened that Elephants have returned and smelled them out as a dog scents a rabbit.

On account of the slow growth of young Elephants it has been found more satisfactory in India to catch wild Elephants than to breed them in captivity and wait fifteen years for the young to reach maturity and usefulness. The plan usually pursued is to build a huge corral in a tract of forest where wild Elephants roam, usually across an Elephant path. Where the path enters the corral a heavy gate is made and suspended over the way, so that it can be instantly dropped and fastened. Then, when a herd of wild Elephants wanders near enough to the trap on the gate side an army of native beaters is hastily gathered and the troop

is surrounded on three sides. Each beater is provided with a tom-tom or torch, and in the confusion of shouting and torch-waving the whole herd is driven into the enclosure. At first they charge the stockade wildly, and the natives rush from side to side, resisting their attacks with fire and uproar. When at last they stand huddled together in the middle of the enclosure tame Elephants are driven in and allowed to mix freely with the wild ones. Cautiously they single out an Elephant, surround him and hold him in place, while men called noosers slip quietly down from the backs of the tame Elephants and fasten strong, soft ropes about his feet, after which he is marched out of the corral between two Elephants and tamed to work as they work, carrying heavy loads, dragging and piling timber, or perhaps marching in the splendid processions of Eastern kings.

DANE COOLIDGE.

THE WILD CLEMATIS.

Brave Clematis, through sunny days and long,
I watched thee toil to reach a leafy height,
Proud of thy kirtle green, and bloom-hood white;
And now when winds are riotous and strong,
Thou flauntest silken plumes sere leaves among,
To lead my glances from the Frost-King's blight
And as of old my longing eyes delight,
Thou, fairest climber of the rustic throng;
And I take courage by thy bravery,
My much-plumed friend of tangled copse and vale,
That fain would hide the mars of autumn's hour,
Henceforth I strive that others only see
My higher self as outward graces fail,
And see that self through love's ennobling power.
Jenny Terrill Ruprecht.

TOPSY.

Ethel Tyler has a tame crow for a pet. It is so black and such a mischievous creature that Ethel named her Topsy.

Topsy was quite small when given to Ethel, and she has learned to say a number of words.

There is a large orchard back of the house, and Topsy seems to think this her special playground. Here she can play about and "caw" to her heart's content.

She loves to hide among the branches of a tree, then call, "Ethel, Ethel," expecting Ethel to come and hunt for her.

Topsy is very amusing, for there is no end to her tricks and pranks, but she can also be very troublesome if she is so disposed.

Her greatest fault is that of stealing. Small articles, as keys, thimbles, spools of thread and such things have to be kept where she cannot get at them or they will be missing.

Her eyes are quick and she is so sly that she generally gets away with the things without being caught.

When articles are missed, we know whom to blame, but it is quite another thing to find them, for she seldom uses a hiding place after it has once been discovered and her plunder removed.

There is one member of the Tyler family that has not a high opinion of Topsy, and that is Tony, Ethel's cat.

Topsy does her part towards making the poor cat's life miserable, and I guess Tony thinks she is quite successful.

She tips over his saucer of milk, pecks at his tail, swoops down upon him when he is eating, seizes his meat and flies to a place of safety before Tony realizes that he has been robbed. Topsy then proceeds to eat her booty, chattering to herself as though she had done a brave deed.

Tony stands in fear of Topsy, and she knows it, and is not slow in taking ad-

vantage of the knowledge whenever an opportunity presents itself.

When Topsy calls, "Tony, Tony," the cat lengthens the distance between himself and the artful crow, for he knows by experience that she only wants the tuft of fur at the tip of his tail or a piece of the rim of his ear.

There is no trouble about feeding Topsy. As long as she has plenty to eat it does not matter what the food might be and she never stops to inquire whether it is fresh or not.

She is very fond of fish, and it is amusing to watch her when a fish cart comes along.

Mrs. Tyler patronizes a certain man that sells fish, and he stops in front of the house and blows his horn so that she will know he is there. Topsy has learned to associate the blast from the horn with "fish," and the minute she hears a horn blown she starts for the street.

She always receives a piece of fish if it is Mrs. Tyler's fish monger that is passing, but it often happens that it is a stranger going by and then Topsy follows the cart down the street to see if he will not throw her a piece of fish. If he does not, she comes back chattering angrily at being cheated out of so enjoyable a meal.

Ethel will call, "Topsy, Topsy," and the crow will come hopping to her. "Shake hands," and Topsy will raise one of her black feet and put it in Ethel's hand for her to shake.

When Topsy wishes to go into the house she stands on the door step and calls, "Mamma, Papa or Ethel" until some one comes and lets her in.

She has many opportunities to leave the place and shift for herself, but she never goes far from the house and seems to prefer making her home with the Tyler family.

MARTHA R. FITCH.

THE WALRUS.

(*Trichechus rosmarus*.)

The Walrus (*Trichechus rosmarus*) is a very fat, clumsy brute, much uglier than his picture, with a coarse, oily skin all wrinkled and scarred; long, protruding tusks; bristly whiskers and scuffling flippers that barely serve to move his bulky body over the land. In the water he is more at home, and though it does not require a high degree of strength and skill to dig clams, that being his daily occupation, yet he is able to keep very fat on the fruits of his industry and has much leisure to swim about or doze on ice floes and sea beaches.

It is only in the arctic regions that Walrus are found. Before the attacks of whalers and ivory hunters they were found as far south as Nova Scotia and the Gulf of St. Lawrence, but now they have retreated as far as possible into the frozen north, living in limited numbers about Hudson's Bay, Davis Straits and Greenland and in Spitzbergen and Northern Europe. In the northern Pacific before the slaughter began the Walrus swarmed by thousands in the broad, shallow bays from the Alaskan Peninsula to Point Barrow, where the ice never melts.

The food of the Walrus consists of mollusks and crustaceans, which he digs from the muddy bottom with his long tusks, and the roots and stalks of seaweed. He crushes the clams, shells and all, and swallows the mass, leaving digestion to proceed as it may. The stomach of a Walrus killed in Bering Sea by Mr. Henry W. Elliott contained more than a bushel of crushed clams in their shells, with enough other food to make half a barrel.

It is principally for its ivory tusks and the accumulated fat which comes from heavy eating that the Walrus is now being exterminated by whalers and hunters. To the Eskimo the Walrus means life itself. He eats the flesh, burns the fat for fuel and light, makes his boats,

houses, harness and harpoon lines from the hide and trades what ivory he has not made into implements for the guns and whisky so acceptable to primitive man. The extermination of the Walrus will probably mean the extermination of the Eskimos, or at least an entire change in their habits of life.

Although a very fierce looking animal, the Walrus is reputed to be peaceful and inoffensive except when attacked in the water. At such times he has been known to hook his tusks over the edge of the boat and swamp it or even to call in his friends by bull-like roars and smash the boat to pieces. Besides man, his one enemy is the polar bear, which creeps upon him as he sleeps and worries him to death. As the Walrus' skin is anywhere from half an inch to two inches thick and padded out by an average of six inches of fat, it is almost impossible to reach a vital place even with long teeth and bear claws, and the Walrus is often able to flounder into the deep water and escape by remaining under water until the bear has to come up for breath.

One of the favorite amusements of the Walrus is to float in the water with his hind flippers hung down and his nose comfortably above the wash and either fall asleep or indulge in deep roarings which are said to sound like something between the mooing of a cow and the baying of a mastiff and which often serve, like whistling buoys, to warn sailors from rocks and shoals.

The young are born in the spring, and generally on the ice floes, but being born fat the ice floes are probably as warm to them as is a nest to a little mouse. The mothers show great affection for their young, and will not abandon them in danger, even allowing themselves to be speared while protecting their offspring. As the Walrus are social by nature, wandering about in great herds, and as they



WALRUS.
(*Trichechus rosmarus*).

LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO

also show a marked sympathy for each other's misfortunes, it is very dangerous to wound one in the water lest the whole herd join in a common defense.

An adult male Walrus measures about twelve feet from the end of his nose to that of his very short tail, or fourteen feet to the end of his hind flippers, and weighs something over a ton. His girth is as great as his length, in fact, it has been

often observed that his great circumference and too-loose skin seem rather a source of annoyance than otherwise too him, especially when he tries to land on a sandy beach. Even with the wash of the breakers he is rarely able to get beyond the water line, except as the tide goes down and leaves him, dry perhaps, but yet at the mercy of men and polar bears.

DANE COOLIDGE.

TOUCHING INCIDENTS ABOUT PIGEONS.

The homing pigeon has proved that locality is a faculty fully developed in the bird's little brain, but I heard, the other day, an instance of memory in the species that was most touching. A lady living in the top story of a Boston skyscraper had been in the habit of feeding the pigeons and sparrows who flew to the little balcony before her window, and had succeeded in taming some of her pensioners, one or two pigeons even eating out of her hand. One day, while passing along Park street, this lady was surprised to see a pigeon flutter away from some companions strutting in the middle of the road, and come upon the sidewalk, where it almost tripped her up in its efforts to attract her attention. It fluttered around her, evincing every sign of pleasure and recognition, and when she called it by name the little creature fairly flew at her! Now, in the midst of all that passing throng the pigeon knew its benefactor, who, with tears in her eyes, says its recognition gave her more joy than if the queen had saluted her. Under the circumstances, it was to her great regret that she had no crumbs to give him then and there. But who ever dreamed of being accosted in the street by a pigeon?

Our attention has been called by a traveling friend to an incident which occurred recently in the family of G. F. Marsh, a member of the Pacific Coast Pigeon Society. It certainly proved to him, and to all his friends in that region, in a most impressive manner the valuable

services which may sometimes be rendered by the carrier pigeon, and probably explains some of his enthusiasm in that direction. His little baby boy was taken suddenly sick with most alarming symptoms of diphtheria.

The mother, watching by the bedside of the little one, dispatched a message tied on a carrier pigeon to her husband at his store on Market street, San Francisco. In the message she wrote the nature of the child's alarming illness, and made an urgent appeal for medicine to save its life. The bird was started from the home of the family near the Cliff House, five miles from Mr. Marsh's store.

The bird flew swiftly to the store, where Mr. Marsh received it. He read the message, called a doctor, explained the child's symptoms as his wife had detailed them in her message, and received the proper medicine. Then tying the little vial containing the precious restorative to the tail of the pigeon, he let it go.

The pigeon sped away swiftly through the air straight for the Cliff. It made the distance, five miles, in ten minutes, a distance which would have required the doctor three-quarters of an hour to cover.

In twenty minutes from the time the mother's message was sent to her husband the baby was taking the medicine.

Naturally enough Mr. Marsh is partial to pigeons, for he considers that he owes his baby's life to one.

George Bancroft Griffith.

ON THE SAN JOAQUIN.

It was in the latter part of the month of March that we started out from Fresno for a day's outing on the San Joaquin river, hunting for hawk and owl eggs. The day was bright and warm, and we keenly enjoyed the ride of nine miles across the plains. Out past the old, deserted Holland Colony, where stumps of vines showed that the settlers had once made an honest attempt to win their daily bread out of the hard pan. The last half of the way lay across the hog-wallow country, that peculiar effect which has puzzled many scientists, but which all attribute to the action of water in long past ages. The rolling motion of rising over and descending these mounds was like the riding of a small boat over the waves of the sea. Here and there a burrow in the top of one of the mounds, the domicile of the frisky ground-squirrel or the billy owl, gave the landscape the appearance of a dish of mush cooking, with the air bubbles swelling up, and some bursting, leaving the little holes. On across canals, past a wheat country, and then the virginal hog-wallow lands that no plowshare has ever touched, covered with a short green growth which gives nourishment to bands of sheep, dirty, and with numerous lambkins, guarded by a few sagacious shepherd dogs and lonely, and equally dirty, bearded Mexican herders.

The mounds grow higher and the hollows deeper until we wonder if they stretch on forever and if we are lost among them, when all at once we come out right on the top of a high bluff overlooking the San Joaquin. The unexpectedness is quite startling. One could not possibly have suspected a moment before that we were within miles of a great river bed more than a mile wide, with steep bluffs more than 300 feet high on either side and a swift river sweeping down its channel in the center, but here we were

right on the edge of it. We can look down almost perpendicularly and see, three or four hundred feet below us, great green meadows stretching to the north and south and to the trees and thickets that edge the river. The river from this distance and height seems but a thread in its once vast bed. What a sight—what a power it must have been when once it filled all this vast bed, which often is more than a mile across from bluff to bluff. On the further side a few trees grow right on the edge of the water, and then the bluff rises abruptly even higher than on our side. Buzzards and hawks are sweeping around us in the air, and dark spots in the tops of far-off trees betoken the presence of the objects of our search, the nests of the hawks. We begin the descent, which at first seems extremely hazardous, and even on further trial sufficiently steep to make walking down more of a pleasure than riding, as we find. The road or path winds around and around, as necessarily it must unless one would go head-first to the bottom. It is narrow and steep and the ruts deeply worn in places by the action of water. About half way down we come upon what was once a canal, and we can see the level ridge of its embankment stretching away above and below us along the side of the bluff, as it curves in and out. What a vast undertaking it must have been to build this great waterway along the face of the bluff. As we near the bottom clumps of elderberry and scraggly greasewood appear, and we come upon two little white eggs of the dove, laid in a hollow in the ground—an early bird surely.

At last we are safely down in the valley and across the meadow, which is one vast bed of poppies, a field of the cloth of gold. Then we come down among the huge cottonwoods and river oaks that line the river bank and unharness our

horse and tie him where the grazing is good and then start on our search. We first make our way down to the river's edge and, lying flat on the sand and rocks, drink to our content of the cool water fresh from the snow of the Sierras. The river is about five hundred feet wide and varies from two hundred to a thousand at this point. It is not high now, for the spring floods come later, with the melting of the snow, and in its deepest part is not probably over eight or ten feet, but it is swift—terribly swift. It is a good swimmer that can hold his own with the current for five minutes, and in the swiftest part it is impossible for a man to make any headway. The bottom is of shifting sand and the channel is ever changing. It is a deceitful and treacherous river, though laughing and sparkling in the sun to-day. It has taken value for value for all the gold it has given up. Here and there in the deep places under the shadow of the bank we can see catfish and big carp moving lazily about. The catfish and a fish known as the river trout can be caught with a hook and line, but the carp never touches bait, but there is considerable sport in spearing them.

We pass up the stream with our eyes directed at the tree tops, but now and then at the ever-changing aspect of the river, taking in all the beauties of nature and the curious formation of the steep sides of the bluff. The face of the bluff represents excellently the different geological layers of soil and stone, here chalky, there slaty, and here gaudily daubed with all the brilliant hues of a clay formation. The cottonwood and the willows are just beginning to show green. Now and then we come upon a nest in the cottonwood trees, far out over the water. Sometimes it is an old one, but often we are convinced otherwise by the sudden departure of a screaming hawk as we throw a dead limb in that direction. Then comes the hard climb, the toilsome shin to reach the first limb, with knees and elbows hugging tightly the smooth, slippery bark, taking advantage of every little knot and twig, and then, the limb gained, up from limb to branch, up into the air, into the cooling breeze, feeling for the instant the life of the birds, up

into the swaying lesser branches, up to the tip-top, where the big, rough nest of sticks is firmly placed, the nether end of a jackrabbit carcass half hanging over the edge, and numerous ears, paws and small bones along the rim, and inside four handsome, large, speckled brown eggs of the squirrel hawk. Into our little sack they go, regardless of the remonstrances of the angry hawk, which is circling around overhead, and with the sack firmly held in our teeth we descend to the ground, pack the eggs into our case and go on. Sometimes in the distance huge clumps of mistletoe on the river oaks look like nests, but nearer approach shows the difference. Mistletoe is very plentiful here. What a place for a party of girls and boys to spend Christmas. Now we come upon a bend in the river where the ground is all strewn with driftwood left by some winter freshet. There is enough to keep many families in fuel for a long time, but it lies there untouched, inaccessible, to be carried on at the next flood—on to where? Who knows the ending of the travels of a piece of driftwood that starts from the mills far up in the Sierras? The wood is washed smooth and round and into every conceivable shape. At places we pass through thickets of rose bushes, blackberry vines, and elderberry, which grow profusely all along the river. In a many-limbed willow tree, an easy climb and not a high one, we find the nest of a horned owl, with five round white eggs within. The old bird stayed on the nest until we were nearly to it and then, with a peculiar cry, scrambled over the side and fell to the ground as if shot, then arose to a neighboring branch and sat there, uttering a cry like a cat and swelling out her feathers angrily, but all in vain. Further up the river ran in close to the bluff on our side, and as the traveling was rather difficult along land that lay at an angle of only five or ten degrees from the vertical, we scrambled to the top, at times slipping, and often pulling ourselves up by the weeds, so steep it was. A misstep would have sent us rolling into the river below. In the face of the bluff squirrels had their homes, and we found the dwellings therein of two handsome big snowy owls, but they had wisely chosen them in places

where the five degrees of slope was in under us and a crumbling of the sand meant a straight drop of fifty or sixty feet, so we left them with "requiescat in pace." For a quarter of a mile we followed along the top of the bluff, watching the river and the tree tops below us. Flocks of ducks were flying up and down the river, quacking vigorously. Now and then a big, ugly "shack" rose from a stump and flapped across the river. Isles big and little and middlesized were dotted in the stream, all heavily covered with underbrush, an excellent refuge for the ducks in their nesting season a little later on. A big white pellican sat on a log watching its victims in the water. The river curves and bends and doubles on itself, and never goes straight for forty yards at a time. At a bend we came upon a scene that delighted our ornithological eyes. One hundred feet below us, in the tops of a clump of cottonwoods, was a heronry. Dozens of big, basket-like nests blackened the tree tops, and perched on the very topmost branches were dozens of long-legged, crooked-necked, great blue herons. As we came upon them they started up, flapping their wings, stretching out their necks and pulling in their legs behind them. Uttering cries like those of the seagulls, they flapped off and lit away upon the plains, but within sight of us, and seemed to be holding a consultation. We could see into the most of the nests, and they were all empty. It was a little too early for the birds to begin nesting, and they were evidently mating and perhaps deciding who should have first choice. Some nests looked like old family residences of many generations, for they had several stories and additions, porticos and dormer windows, so to speak, in abundance.

We passed on, and when the valley widened out again we descended and sat down under the oaks to eat our luncheon. It soon disappeared, the last morsel, and we were on our way again. At long intervals farm houses appeared on the edge

of the bluff, and in the river below one of them, on the opposite side of the stream from us, was a curious old water-wheel on a flatboat securely moored to the trees on the bank, and which laboriously and noisily jerked water up through a pipe to the bluff above. The meadows along the river are the pasturage of big herds of horses and cattle, and one is lucky if one's perambulations are not interrupted by some inhospitable bull. As we ascend the river it grows swifter and more rocky and the top of the bluff rolls higher and higher and the hills appear in the distance. When we came to the first of these low hills we climbed the bluff and ascended it. It was a peculiar formation of stone resembling sand in softness or sand resembling stone in hardness, we could hardly determine which. It was seamed and ribbed, projecting cliff-like into the air, with boulders lying about and with caverns and precipitous sides. As we scaled to the top of it we scared away a number of turkey buzzards that had been watching our ascent, and it was evidently their nesting place, as we discovered traces of old nests and a good many bones of the hapless denizens of the plains. We started several of the big boulders at the edge rolling and plunging down, and, though most of them broke up in their downward career, they stopped only when, after a great plunge, they settled in the bed of the river. Sometimes as they thundered down they would startle a rabbit from his repose, and off he would scamper in great affright. But it was getting near sundown and we were miles from our wagon, and even when we reached that we would be ten miles from home, so we set out on our return with spirits not lacking, but appetites sorely pressing. The miles of climbing up hill and down hill in the pure air had done us more good than months in a gymnasium, and when, long after dark, we reached our home in Fresno town, what a supper we did eat.

CHARLES ELMER JENNEY.

THE BENGAL TIGER.

(*Felis tigris*.)

The Bengal Tiger (*Felis tigris*) inhabits the hotter regions of Southern Asia, but the species is found with certain color variations throughout the lower levels of all Asia from Siberia to the River Euphrates and as far south as Sumatra and Java. Next to the lion it is the strongest and most ferocious of carnivorous animals, and, on account of the heavily wooded country in which it lives being densely populated, the Tiger is even more destructive of human life. In Bengal alone three hundred and forty-seven persons were reported killed by Tigers in a single year, and this in spite of the best efforts of the government and people to mitigate the evil by poisoning, hunting and trapping.

Mr. William T. Hornaday, who hunted Tigers on his collecting trip in India, says in his book, "Two Years in the Jungle," that only a limited number of Tigers, and those of the old and decrepit sort, ever kill men at all, but once they have tasted human flesh they continue to kill until some hunter reciprocates and brings peace again to the ravaged district. According to their habits in procuring food the people of India divide Tigers into three classes—the "game killer," the "cattle lifter" and the "man killer." The "game killer" lives in the dense forest, catches his own deer and wild hogs and is very self-respecting and honest, for a Tiger. The "cattle lifter" is a fat and lazy cat, who hangs around villages and kills a steer from the herds whenever he is hungry. Dragging away the carcass he returns to it until it is all eaten, when he kills again, while the timid and defenseless natives flee in terror or hover about, unable to protect their herds. It is after these fat "cattle lifters" get old and mangy that they turn "man eater," finding it easier to catch the herdsman than to drag off a bullock. Then after the first taste they haunt the paths and villages, pouncing upon men, women

and children until there is no safety, except within doors, until some hunter has slain the foe.

Among the English of India Tiger hunting is a favorite sport. A most picturesque and safe way is to mount on an Elephant and be driven about through the country beating up the Tigers from cover and shooting them with the huge four-bore rifles which the English sportsmen affect. The principal danger lies in the stampeding of the elephant or the attack of a wounded Tiger on the elephant himself. The more common way is to build a shooting platform by some water hole or carcass and lie in wait for the Tiger, or, better yet, have a small army of beaters drive him from his lair and past the spot where the platform has been erected.

Sometimes men who like to take chances follow the Tigers on foot and shoot them where they find them, which is often coming straight through the air. A glance at the illustration will show what powerful forearms and shoulders the tiger has. One blow from that paw will break a bullock's back, and a wounded Tiger is more dangerous than one unhurt. Unless the brain is reached or the spinal column broken a Tiger will not stop in his charge, and the most active man can hardly avoid his clutches.

An adult Bengal Tiger measures ten feet from tip to tip, stands over three and a half feet in height and weighs five hundred pounds. If we consider the strength, activity and ferocity of the ordinary house cat and then think of it multiplied a hundred times we can form some conception of the Bengal Tiger as he lies down by his water hole and wonders what he will kill next.

In color the Tiger matches the foliage of his native jungles. When lying in grass or even upon the ground the dark markings and rufous fawn colors of his body blend almost perfectly with his surroundings, and it has often happened

that his presence was only guessed by the thrashing of his nervous tail in the grass as he gathered for a leap. Grassy plains and swamps are his favorite abiding places, and he does not hesitate to swim from island to island in search of prey. Curiously, again, for a cat, the Tiger does not climb trees except when forced to do so by floods.

The Tigress gives birth to from two to six cubs and is most affectionate toward them and aggressive toward intruders while she has them in charge.

As soon as they can eat she begins to kill for them, and teaches them by a thousand cruel tricks to imitate her example. Not until they are nearly grown and able to kill for themselves does she separate herself and leave them to shift for themselves. Young Tigers are far more destructive than old, killing three or four cattle and eating one, as if they wished to learn their duties in life well or were mad with the rage to kill.

DANE COOLIDGE.

AD VESPERAM.

With bars of beaten brass and amethyst,
Evening hath shut the crimson sun within
A pasturage, where fleecy cloud-flocks win
Uncertain nurture from pelagian mist,
The singing of a feathered rhapsodist
Sounds from the darkening wood: O Night begin!
Bright pageant of the stars, come, usher in
The hour when Peace, a potent exorcist,
Casts out the turbulence and fret of day.
Now as the last faint bird notes die away,
And sunset's glory fades from out the west,
Cometh an angel and his name is Rest.
On white dream wings I soar away with him,
Farewell, O Earth; farewell, O twilight dim!

Mary Grant O'Sheridan.

BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. X.

OCTOBER, 1901.

No. 3

SONNET—OCTOBER.

The month of carnival of all the year,
When Nature lets the wild earth go its way,
And spend whole seasons on a single day.
The spring-time holds her white and purple dear;
October, lavish, flaunts them far and near;
The summer charily her reds doth lay
Like jewels on her costliest array;
October, scornful, burns them on a bier.
The winter hoards his pearls of frost in sign
Of kingdom: whiter pearls than winter knew,
Or Empress wore, in Egypt's ancient line,
October, feasting 'neath her dome of blue,
Drinks at a single draught, slow filtered through
Sunshiny air, as in a tingling wine!

—Helen Hunt Jackson.

October comes, a woodman old,
Fenced with tough leather from the cold;
Round swings his sturdy axe, and lo!
A fir-branch falls at every blow.

—Walter Thornbury.

THE YELLOW-BELLIED FLYCATCHER.

(*Empidonax flaviventris*.)

The Yellow-bellied Flycatcher with the kingbird, the phoebe and the wood pewee belongs to a family of birds peculiar to America—the family Tyrannidæ or the family of tyrants. No better name could be applied to these birds when we take into consideration the enormous number of insects, of all descriptions,*that they capture and devour and their method of doing it. They resemble the hawks in some respects. They are at home only where there are trees, on the outer branches of which they can perch and await a passing insect, and when one appears they “launch forth into the air; there is a sharp, suggestive click of the broad bill and, completing their aerial circle, they return to their perch and are again en garde.”

In the tropics, the land of luxuriant vegetable growth, where the number and kinds of insects seem almost innumerable, the larger number of the three hundred and fifty known species are found. In the United States we are favored with the visits, during the warmer months, of but thirty-five species of these interesting and useful birds.

As we would naturally expect of birds of prey, whether hunters of insects or of higher animal life, these birds are not usually social, even with their own kind. They are also practically songless, a characteristic which seems perfectly fitted to the habits of the Flycatchers. Some of the species have sweet-voiced calls. This is the case with the wood pewee, of which Trowbridge has so beautifully written in the following verse:

“Long-drawn and clear its closes were—

As if the hand of Music through

The sombre robe of Silence drew

A thread of golden gossamer;

So pure a flute the fairy blew.

Like beggared princes of the wood,

In silver rags the birches stood;

The hemlocks, lordly counselors,

Were dumb; the sturdy servitors,

In beechen jackets patched and gray,

Seemed waiting spellbound all the day

That low, entrancing note to hear—

‘Pe-wee! pe-wee! peer!’”

The Flycatchers are fitted both in the structure of their bills and in the colors of their plumage for the kind of life that they live. The bills are broad and flat, permitting an extensive gape. They live in trees and are usually plainly colored, either a grayish or greenish olive, being not so easily seen by the insects as if more brightly arrayed. This characteristic is known as deceptive coloration.

The Yellow-bellied Flycatcher has its summer home in eastern North America, breeding from Massachusetts northward to Labrador. In the United States it frequents only the forests of the northern portion and the mountain regions. In the winter it passes southward into Mexico and Central America. Like all the Flycatchers of North America, the very nature of its food necessitates extensive migrations.

Its generic name is very suggestive. It is *Empidonax*, from two Greek words, meaning mosquito and a prince—Mosquito Prince!

Major Bendire says: “In the Adirondack mountains, where I have met with it, it was observed only in primitive mixed and rather open woods, where the ground was thickly strewn with decaying, moss-covered logs and boles, and almost constantly shaded from the rays of the sun. The most gloomy looking places, fairly reeking with moisture, where nearly every inch of ground is covered with a luxuriant carpet of spagnum moss, into which one sinks several inches at every step, regions swarming with mosquitoes and black flies, are the localities that seem to constitute their favorite summer haunts.” Surely the name *Empidonax* is most appropriate.

The nest is usually constructed on upturned roots near the ground, or on the ground deeply imbedded in the long mosses. A nest belonging to the National Museum is thus described: “The primary foundation of the nest was a layer of brown rootlets; upon this rested the bulk of the structure, consisting of moss matted together with fine broken weed stalks and other fragmentary material.



YELLOW-BELLIED FLYCATCHER.
(*Empidonax flaviventris*).
About Life-size.

UNIVERSITY OF ILLINOIS
URBANA

The inner nest could be removed entire from the outer wall, and was composed of a loosely woven but, from its thickness, somewhat dense fabric of fine materials, consisting mainly of the bleached stems of some slender sedge and the black and shining rootlets of ferns, closely resembling horsehair. Between the two sections of the structure and appearing only when they were separated, was a scant layer of the glossy orange pedicels of a moss not a fragment of which was elsewhere visible. The walls of the internal nest were about one-half an inch in thickness and had doubtless been accomplished with a view of protection from dampness." The nests are sometimes made of dried grasses interwoven with various mosses and lined with moss

and fine black wire-like roots. Again, the birds seem to have an eye for color and will face the outside of the nest with fresh and bright green moss. In every way the nest seems a large house for so small a bird.

To study this Flycatcher "one must seek the northern evergreen forests, where, far from human habitations, its mournful notes blend with the murmur of some icy brook tumbling over mossy stones or gushing beneath the still mossier decayed logs that threaten to bar the way. Where all is green and dark and cool, in some glen overarched by crowding spruces and firs, birches and maples, there it is we find him and in the beds of damp moss he skillfully conceals his nest."

THE REIGN OF THE WHIPPOORWILLS.

When dews begin to chill
The blossom throngs,
And soft the brooklets trill
Their slumber-songs,
We dusky Whippoorwills
In conquest hold the hills.

When, thro' the midnight dells,
Wild star-beams glow,
Like wan-eyed sentinels,
We dreamward go,
And hear sung sweetly o'er
The songs we stilled before.

When waketh dawn, we flee
The slumber-main,
And bid the songsters be
With us again
To sing in praise of light
Above the buried night.

But O, when sunrise gleams,
We vanish fast,
And woo again in dreams
The starlit past,
Till, lo! at twilight gray,
We wail the dirge of day!

—Frank English.

RUBY-CROWNED KINGLET.

(*Regulus calendula.*)

"What wondrous power from heaven upon thee wrought?
What prisoned Ariel within thee broods?"

—*Celia Thaxter.*

"Thou singest as if the God of Wine
Had helped thee to a valentine;
A song in mockery and despite
Of shades and dews and silent night,
And steady bliss and all the loves
Now sleeping in these peaceful groves."

—*Wordsworth.*

Like a bee with its honey, when the Ruby-crown has unloaded his vocal sweetness, there is comparatively little left of him, and, ebullient with an energy that would otherwise rend him, his incredible vocal achievement is the safety valve that has so far preserved his atoms in their Avian semblance.

Dr. Coues says that his lower larynx, the sound-producing organ, is not much bigger than a good-sized pin's head, and the muscles that move it are almost microscopic shreds of flesh. "If the strength of the human voice were in the same proportion to the size of the larynx, we could converse with ease at a distance of a mile or more."

"The Kinglet's exquisite vocalization," he continues, "defies description; we can only speak in general terms of the power, purity and volume of the notes, their faultless modulation and long continuance. Many doubtless, have listened to this music without suspecting that the author was the diminutive Ruby-crown, with whose commonplace utterance, the slender, wiry 'tsip,' they were already familiar. This delightful role, of musician, is chiefly executed during the mating season, and the brief period of exaltation which precedes it. It is consequently seldom heard in regions where the bird does not rear its young, except when the little

performer breaks forth in song on nearing its summer resorts."

When Rev. J. H. Langille heard his first *Regulus calendula*, he said, "The song came from out of a thick clump of thorns, and was so loud and spirited that I was led to expect a bird at least as large as a thrush. Chee-oo, chee-oo, chee-oo, choo, choo, tseet, tseet, te-tseet, te-tseet, etc., may represent this wonderful melody, the first notes being strongly palatal and somewhat aspirated, the latter slender and sibilant and more rapidly uttered; the first part being also so full and animated as to make one think of the water-thrush, or the winter wren; while the last part sounded like a succedant song from a slender-voiced warbler. Could all this come from the throat of this tiny, four-inch Sylvia? I was obliged to believe my own eyes, for I saw the bird many times in the act of singing. The melody was such as to mark the day on which I heard it."

H. D. Minot says, "In autumn and winter their only note is a feeble lisp. In spring, besides occasionally uttering an indescribable querulous sound, and a harsh, 'grating' note, which belongs exclusively to that season, the Ruby-crowned wrens sing extremely well and louder than such small birds seem capable of singing. Their song begins with

a few clear whistles, followed by a short, very sweet, and complicated warble, and ending with notes like the syllables tu-we-we, tu-we-we, tu-we-we. These latter are often repeated separately, as if the birds had no time for a prelude, or are sometimes prefaced by merely a few rather shrill notes with a rising inflection."

Messrs. Baird, Brewer and Ridgway say that "The song of this bird is by far the most remarkable of its specific peculiarities," and Mr. Chapman declares, "Taking the small size of the bird into consideration, the Ruby-crown's song is one of the most marvellous vocal performances among birds; being not only surpassingly sweet, varied and sustained, but possessed of sufficient volume to be heard at a distance of two hundred yards. Fortunately he sings both on the spring and fall migrations."

Mrs. Wright describes the call-note as "Thin and metallic, like a vibrating wire," and quotes Mr. Nehrling, who speaks of the "Power, purity and volume of the notes, their faultless modulation and long continuance."

Mr. Robert Ridgway wrote that this little king of song was one of our very smallest birds he also "ranks among the sweetest singers of the country. It is wonderfully powerful for one so small, but it is remarkable for its softness and sweet expression more than for other qualities. It consists of an inexpressibly delicate and musical warble, astonishingly protracted at times, and most beautifully varied by softly rising and falling cadences, and the most tender whistlings imaginable."

Mr. Ridgway quotes from Dr. Brewer: "The notes are clear, resonant and high,

and constitute a prolonged series, varying from the lowest tones to the highest, and terminating with the latter. It may be heard at quite a distance, and in some respects bears more resemblance to the song of the English skylark than to that of the canary, to which Mr. Audubon compares it." Mr. Ridgway continues: "We have never heard the skylark sing, but there is certainly no resemblance between the notes of the Ruby-crowned Kinglet and those of the canary, the latter being as inferior in tenderness and softness as they excel in loudness."

Mr. Audubon had stated: "When I tell you that its song is fully as sonorous as that of the canary-bird, and much richer, I do not come up to the truth, for it is not only as powerful and clear, but much more varied and pleasing to the ear."

While the frequent sacrifice of the adult regulus and regina through their reckless absorption in their own affairs and obliviousness to the presence of enemies, lends color to the statement that "The spirits of the martyrs will be lodged in the crops of green birds," yet by virtue of a talent other than vocal, they compel few of the human family to echo the remorseful lament of John Halifax, Gentleman,

"I took the wren's nest,
Bird, forgive me!"

For but few of the most ardent seekers have succeeded in locating the habitation of the fairy kinglet, and the unsuccessful majority perforce exclaim with Wordsworth,

"Oh, blessed bird! The earth we pace
Again appears to be
An unsubstantial, fairy place,
That is fit home for thee!"

JULIETTE A. OWEN.

THE CORN SONG.

Heap high the farmer's wintry hoard!
Heap high the golden corn!
No richer gift has autumn poured
From out her lavish horn!

Let other lands, exulting, glean
The apple from the pine,
The orange from its glossy green,
The cluster from the vine;

We better love the hardy gift
Our ragged vales bestow,
To cheer us when the storm shall drift
Our harvest-fields with snow.

Through vales of grass and meads of
flowers,
Our ploughs their furrows made,
While on the hills the sun and showers
Of changeful April played.

We dropped the seed o'er hill and
plain,
Beneath the sun of May,
And frightened from our sprouting
grain
The robber crows away.

All through the long, bright days of
June,
Its leaves grew green and fair,
And waved in hot midsummer's noon
Its soft and yellow hair.

And now, with Autumn's moonlit eves,
Its harvest time has come,
We pluck away the frosted leaves,
And bear the treasure home.

Then, richer than the fabled gift
Apollo showered of old,
Fair hands the broken grain shall sift,
And knead its meal of gold.

Let vapid idlers loll in silk,
Around their costly board;
Give us the bowl of samp and milk,
By homespun beauty poured!

Where'er the wide old kitchen hearth
Sends up its smoky curls,
Who will not thank the kindly earth,
And bless our farmer girls?

Then shame on all the proud and vain,
Whose folly laughs to scorn
The blessing of our hardy grain,
Our wealth of golden corn!

Let earth withhold her goodly root,
Let mildew blight the rye,
Give to the worm the orchard's fruit,
The wheat-field to the fly;

But let the good old crop adorn
The hills our fathers trod;
Still let us, for his golden corn,
Send up our thanks to God!

—John Greenleaf Whittier.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



OLIVE-SIDED FLYCATCHER.
(*Contopus borealis*).
About Life-size.

THE OLIVE-SIDED FLYCATCHER.

(*Contopus borealis.*)

The Olive-sided Flycatcher is a North American bird breeding in the coniferous forests of our Northern States, northward into Canada and in mountainous regions. It winters in Central and South America.

Like all Flycatchers, their food consists almost exclusively of winged insects, such as beetles, butterflies, moths and the numerous gadflies which abound in the places frequented by these birds. A dead limb or the decayed top of some tall tree giving a good outlook close to the nesting site, is usually selected for a perch, from which excursions are made in different directions after passing insects, which are often chased for quite a distance. This Flycatcher usually arrives on its breeding grounds about the middle of May, and its far-reaching call notes can then be heard almost constantly in the early morning hours and again in the Four Birds & Nature Tues—Hammond evening. Unless close to the bird, this note sounds much like that of the wood pewee, which utters a note of only two syllables, like "pee-wee," while that of the Olive-sided Flycatcher really consists of three, like "hip-pin-weet." The first part is uttered short and quick, while the latter two are so accented and drawn out, that at a distance the call sounds as if likewise composed of only two notes, but this is not the case. Their alarm note sounds like "puip-puip-puip," several times repeated, or "puill-puill-puill;" this is usually given only when the nest is approached, and occasionally a purring sound is also uttered.

Tall evergreen trees, such as pines, hemlocks, spruces, firs and cedars, situated near the edge of an opening or clearing in the forest, not too far from water and commanding a good outlook, or on a bluff along a stream, a hillside, the shore of a lake or pond, are usually selected as nesting sites by this species, and the nest is generally saddled well out on one of the limbs, where it is difficult to see and still more difficult to get at.

Only on rare occasions will this species nest in a deciduous tree.

While it appears tolerant enough toward other species, it will not allow any of its own kind to nest in close proximity to its chosen home, to which it returns from year to year. Each pair seems to claim a certain range, which is rarely less than half a mile in extent, and is usually located along some stream, near the shore of a lake, or by some little pond; generally coniferous forests are preferred, but mixed ones answer their purpose almost equally well as long as they border on a body of water or a beaver meadow and have a few clumps of hemlock or spruce trees scattered through them which will furnish suitable nesting sites and lookout perches.

While on a collecting trip a nest of this species was observed in a spruce tree and about forty-five feet from the ground. The birds betrayed the location of the nest by their excited actions and incessant scolding. They were very bold, flying close around the climber's head, snapping their bills at him, and uttering angry notes of defiance rather than of distress, something like "puy-pip-pip." They could not possibly have been more pugnacious.

The nest was a well-built structure. It was outwardly composed of fine, wiry roots and small twigs, mixed with green moss and lined with fine roots and moss. It was securely fixed among a mass of fine twigs growing out at that point of the limb.

As a rule the nests are placed at a considerable height from the ground, usually from forty to sixty feet, though occasionally one is found that is not more than twenty feet.

In spite of their pugnacious and quarrelsome habits these birds are so attached to the localities they have selected for their homes that they will usually lay a second set of eggs in the same nest from which their first set has been taken.—Adapted from Charles Bendire's *Life Histories of North American Birds*.

THE COMING OF MISS OCTOBER MONTH.

Over in Farmer Goodman's timber there was a great stir. Everybody was busy. All summer the trees had been planning a picnic reception to be given to the Month brothers and sisters when the hot weather had passed.

When it became noised around the whole neighborhood was delighted with the thought. Everyone wanted to do what little he could to help things along. Several dignified old owls, who had holes in the trees, promptly offered to chaperone the party. The cat-tails along the brook just at the edge of the timber promised to wear their prettiest head-dresses if they would be allowed to wait on the door. The golden rod, purple asters and other flowers along the road and the ferns, wahoo, sumac and their companions agreed to outdo themselves in the effort to furnish beautiful, tasty decorations.

The refreshments would cost nothing. The spring at the foot of the hill offered to supply clear cool drinks for all, free of charge. They had an abundance of wild grapes, wild cherries, pawpaws, red haws, hazel, hickory and other nuts.

Prof. Wind was engaged to have his band there to furnish music for the dancing.

As it was hoped to make this a long-to-be-remembered event, all summer was spent in planning and preparation. Many were the happy hours passed by the trees in discussing the styles and colors in which they were to be decked. Whenever the band was practicing its new pieces for the occasion the little leaves would dance and skip for joy.

The names of Mr. January Month and all his brothers and sisters, February, March, April, May, June, July, August, September, October, November, December were written on a sheet of paper. The list was handed to a gay little squirrel,

with a handsome tail and pretty stripes down his back. He was then given instructions and sent to do the inviting. A funny little hop-toad wished to go along. The squirrel said that he would be pleased to have company, but he scampered around from place to place as though he were going for a doctor for a dying child. As the little hop-toad could not keep up, he came home crying.

Fancy the disappointment when the squirrel brought back word that pretty Miss October Month was the only one who had accepted the kind invitation. All said that they would be delighted to be there, that they knew that it would be a very happy, jolly affair; but each month claimed that having his own work to do without help he is kept so busy that he has no time for roving and sport. After the trees and their friends had so kindly made such great arrangements for their entertainment and honor, the narrow-minded months were not grateful nor polite enough to even try to manage their work so that they could get off for a day. Perhaps they had forgotten that there is such a thing as fun and rest. Poor Months! No wonder they die so early!

Every plan for a brilliant event had been made. Bright, amiable October came. The day was sunny and warm, but not hot. Everyone did his part according to agreement. The common yellow butterflies, some caterpillars and others insects who had been in no hurry to disappear, were there. Although many of the birds had left for their southern trip, there were a number of catbirds, hermit thrushes, brown thrushes, phoebes, song sparrows and others who furnished rare solos and grand choruses between dances. The cowbirds and yellow-bellied sapsuckers who do not sing wished to do something, too. The cowbirds offered to keep the flies and other insects off of the

victuals, and the sapsuckers agreed to give tapping signals from their high places in the tall trees whenever a change of program was to be announced.

A mischievous bluejay made a slight disturbance by trying to steal some of the dinner before the table was set. When Mrs. Chipmunk tried to drive him off, he showed fight, but in less than a minute such a crowd had gathered to see what was the matter that he took flight in great shame.

Everybody seemed to have fallen in love with Miss October. The affair was such a success and the very air was filled with such good will and jollity, that all begged and coaxed her to remain for a visit.

They had no trouble in arranging amusements for every day. Granddaddy long legs danced several jigs. The crickets and the grasshoppers got up a baseball game. When the baby show came off, Mrs. Quail took the prize for the prettiest baby under a year. Mother Pig who had heard of it and had broken out of Farmer Goodman's pasture in order to bring the plumpest of her litter, carried back the prize for the fattest baby. Mrs. English Sparrow reported the largest number of broods raised. The locusts and the katydids took part in a cake walk.

A great fat young grasshopper and a young robin entered a hopping race. As they came out even there was trouble and prospects of hard feelings. Three butterflies who were acting as judges decided to award the prize to the grasshopper because he was smaller. This decision did not suit the robin. In a fit of impatience he ended the matter by swallowing the grasshopper—legs and all.

During the moonshiny nights Mr. Man-in-the-Moon took great pains to furnish excellent light. On other nights the fireflies showed their brightest lanterns.

Sometimes at night, white-robed Jack Frost would come and play kissing games with the leaves who would then get happier, more radiant faces. But he would box and wrestle with the nuts until their shells would crack open. Then when they came to play tag or puss-wants-a-corner with the leaves, as the little West Wind brothers frequently did, they, in their rough sport, would knock the nuts out of their cosy shells upon the ground, so that the children could pick them up. Merry times were these!

In this way the sports were carried on for thirty-one days and nights. By that time everyone, even Miss October herself, was tired out. The fine dresses of the trees being the worse for wear, dropped, leaf by leaf, and some of the trees were left nearly naked. The grasshoppers, butterflies and caterpillars who could no longer keep their eyes open had dropped into their winter's sleep.

Except the meadow-larks, red winged blackbirds, robins, bluejays, bluebirds and a few others the feathered tribes had been obliged to leave. Some fox sparrows on their way to the south had stopped for a few days; but they said that they could not stay until the festivities were over.

Finally her mother, Mrs. Year, telegraphed to Miss October, who did not know when her welcome was worn out, bidding her to make her adieux and start home instantly. Being exhausted from sleepless days and nights she was glad to leave.

After her departure, in the timber everything became quiet and still, but the trees hoped that sometime in the future they might have another picnic as delightful and jolly, and all felt satisfied and voted the reception a perfect success.

LOVEDAY ALMIRA NELSON.

THE TREE SPARROW.

(*Spizella monticola*.)

"I like to see them feasting on the seed stalks above the crust, and hear their chorus of merry tinkling notes, like sparkling frost crystals turned to music."—*Chapman*.

One who loves birds cannot fail to be attracted by the sparrows and especially by the Tree Sparrow, whose pert form is the subject of our picture. This little bird comes to us in the Eastern United States in September or October and remains throughout the winter. It is at this time common or even abundant as far to the westward as the great plains, and is rare farther west. It is a winter bird and breeds in the colder latitudes north of the United States, where it builds its home of grasses, shreds of bark and small roots interlaced with hair, not high up in trees, as its name might indicate, but upon or near the ground.

Gentle and of a retiring disposition, they prefer the cultivated fields, the meadows, the woods with their borders of shrubs or the trees of the orchard. Such is their confidence, however, that they will even visit the dooryards and prettily pick up the scattered crumbs or grain.

While tramping through a meadow in the early winter and before the snow has disappeared or the frost has hardened and changed the surface of the earth, the tramper may frequently disturb numbers of the sparrows. Flying from the dried grass they will seem to come out of the ground. Speaking of such an incident, Mr. Keyser says: "This unexpected behavior led me to investigate, and I soon found that in many places there were cozy apartments hollowed out under the long thick tufts of grass, with neat entrances at one side like the door of an Eskimo hut. These hollows gave ample evidence of having been occupied by the birds, so there could be no doubt about their being bird bed-rooms."

These little birds seem almost a part of one's animal family, and a companion in those regions where the snow covers the

ground a part of the year. They chirp and often sing quite gaily in the spring. They may often be seen when the thermometer indicates a temperature below zero and the snow is a foot or more in depth. Seemingly all that is required to satisfy them is a plenty of weeds from which they may gather the seeds. They are driven southerly only by a lack of a suitable food supply. Often they may be found resting under clumps of tall grass or vines on which the snow has gathered, forming a sort of roof over the snug retreat. "Whether rendered careless by the cold or through a natural heedlessness, they are very tame at such times; they sit unconcernedly on the twigs, it may be but a few feet distant, chirping cheerfully, with the plumage all loosened and puffy, making very pretty roly-poly looking objects."

A very pretty sight, and one that may frequently be seen, is a flock of Tree Sparrows around some tall weed. Some of the birds will be actively gathering seeds from the branches of the weed, while others will stand upon the ground or snow and pick up those seeds that are dropped or shaken off by their relatives above. While thus feeding there seems to be a constant conversation. If we could but translate this sweet-voiced chirping perhaps we should find that they are expressing to each other the pleasure that the repast is giving them.

Their song is sweet and pleasing. They are not constant songsters, but seem to be moved by some unseen spirit, for a flock will suddenly burst out in a melody of song that is entrancing. He who has been favored with such a concert is indeed fortunate. Their whole being seems to be brought into action in the production of this song, which is "somewhat crude



TREE SPARROW.
(*Spizella monticola*).
About Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

and labored in technique, but the tones are very sweet indeed, not soft and low but quite loud and clear. Quite often the song opens with one or two long syllables and ends with a merry little trill having a delightfully human intonation. There is, indeed, something innocent and child-like about the voices of these sparrows."

The Tree Sparrow is often called the

Winter Chippy and is confounded with the chipping sparrow, which it resembles. It is a larger bird and carries a mark of identification by which it may be easily known. There is on the grayish white breast a small black spot. Moreover, the Tree Sparrow arrives in its winter range about the time that the chippy retires to the Gulf States and Mexico.

THE SPARROWS' BEDTIME.

"Wee, wee, weet, tweet, tweet, tweet!"

What a clatter, what a chatter

In the village street.

"Chee, chee, cheep, cheep, chee, chee, chee!"

What a rustling, what a hustling

In the maple tree.

"Twit, twit, flit, flit, get away, quit!"

How they gabble, how they scabble

As to rest they flit.

"Peep, peep, tweet, tweet, wee, wee, wee!"

How they hurry, how they scurry,

Noisy as can be.

"Tr'r, tr'r, sh, sh, do be still,

You're no wood thrush, wish you could hush,

You know you can't trill."

"Tr'r, tr'r, r'r, r'r, yip, peep, peep,

You're another, I'll tell mother,

I was most asleep."

"Tr'r, sh, chee, chee, peep, yip, yip!"

See them swinging, gaily clinging

To the branch's tip.

"Tr'r, sh, cheep, peep, tee, hee, hee!"

Hear them titter, hear them twitter,

Full of energy."

* * * * *

Sudden silence falls,

Not a peep is heard;

To its neighbor calls

Not one little bird,

Silent too the trees

Calm their secret keeping;

Gently sighs the breeze;

Sparrows all are sleeping.

—Adene Williams.

THE SPARROW FAMILY.

We all know some of the members of the Sparrow family, little gray and brown birds, striped above and lighter underneath. They belong to the Finch family, which is the largest of all the bird families. One-seventh of all the birds belong to this family. Just think how many uncles and cousins and aunts the little sparrows have! They are birds of the ground, not birds of the trees, like the vireos. They only choose high perches when they wish to rest or sing. We see them hunting for food in the grassy meadows, or fresh-plowed field, or in the dusty road. They usually make their nests in low bushes or on the ground and, as a rule, they fly only short distances, and do not skim around just for the fun of it, like the swallows.

There are over forty different kinds of sparrows in our country.

The English sparrows are found all over the world. They stay with us all the year round. We ought to be friendly with them as we have such a good chance to become acquainted. They certainly intend to be friendly with us for they scarcely fly away at our approach. Mother Sparrow is a hard worker, raising four broods every year. Just think how many children and grand-children one sparrow can have! English sparrows are called quarrelsome birds, and I believe it is true that they have driven away many of the pretty bluebirds, but we sometimes think they are quarreling when they are not. Have you ever noticed a crowd of sparrows following one bird? I used to think that they were all quarreling with that one bird; but no, they follow her because they admire and like her. Some people scold a great deal about the harm that the sparrows do to the fruit and grain. But think of the many insects that these birds eat in one year! I believe they do more good than harm, don't you?

The chipping sparrow often builds its nest in tall trees. This is the only sparrow I know of, which builds its nest up

high. This bird is smaller than the English sparrow. It has a reddish-brown back and crown. Did you ever hear its funny little song? It sounds like the buzzing of a locust. It can call, chip! chip! too.

The field sparrow is about the same size as the chipping sparrow and its head and back are of the same color. As can be guessed from its name, it is fond of fields and meadows. The field sparrow sings very sweetly.

Then there is the fox sparrow, which is not only the largest of the sparrows, but the finest singer. It comes about as early as the bluebird. We often hear its sweet song in March. It is called the fox sparrow, not because it is sly like the fox, but on account of its color which is reddish like the fox's fur.

The grasshopper sparrow is smaller than the English sparrow. It has a cry which sounds like a grasshopper in the grass.

The song sparrow is one of the commonest of our birds, staying with us nearly all the year. The name indicates to us that it has a sweet voice. It begins to sing almost as early as the robin and will sing every hour in the day and seems never to tire of singing. The song sparrow is about the same size as the English sparrow.

Then there are the savanna sparrow and the seaside sparrow which are fond of marshes, near the sea; and the white-crowned. This and the white-throated sparrows are both fine singers and handsome birds. They are larger than the English sparrow. The vesper sparrow has a fine voice, singing late in the afternoon and evening. It is as fond of the meadows as the field sparrow. The two birds are often taken for each other, but if the vesper sparrow is watched when it flies, it will be seen that it has white tail quills which the field sparrow does not possess. Both are about the same size.

The winter chippy or tree sparrow is a

winter bird, in the United States appearing in the fall and flying away early in the spring. Its name would indicate that it was fond of trees, but this is not the case, as it is usually seen on the ground and even makes its nest there.

There are many other members of the sparrow family, but this is enough for to-day. I hope that you will watch them and try to become acquainted with all.

NARCISIA LEWIS.

MR. AND MRS. SPARROW'S BLUNDER.

Many people suppose that the instinct of birds and animals is never wrong, but this is a mistake. I have often seen the wild geese fly north over the western prairies only to come squawking back in a few days, to linger with us, if not going farther south, until the sun warmed up the northland and they dared another flight.

Once my brother witnessed a most amusing case of mistaken judgment among birds. He had opened a store in a northern town, and during the month of March was much discouraged by the continued cold weather.

"O! but spring's here!" exclaimed his partner gleefully one bleak day. "See those sparrows building a nest in our eaves? That's a sure sign!" From that on the two young men took great interest in the new home going up under—or rather over—their very eyes. Each new bit of rag or straw woven in was noted,

and they even strewed cotton about in handy places for the birds to use as "carpeting in the mansion."

But the weather did not improve, in spite of the sparrow's prophecy; instead of that, a sleet set in one night, and morning saw a most wintry-looking earth. When the young men went down to open up the store for business, they heard loud, really angry, chirping coming from the eaves. Mr. and Mrs. Sparrow were discussing something with energy, and when at last a decision was reached they both swooped down upon their almost finished nest and tore it all to pieces. Not one twig or rag or straw was left in place. When the destruction was complete they gave a loud chirp of satisfaction and flew off together, never to return.

They had simply made a mistake in their calendar.

LEE MCCRAE.

A WINDOW-PANE REVERIE.

I stood by my study window after dark. An electric light a few blocks distant, cast shadows of the small limbs of a tree upon the window-pane. Those shadows were in constant motion because of the wind blowing through the trees. Through the dancing shadows I saw the brilliant light against the darkness of the western sky. My breath condensed into moisture on the cold glass, and through that moisture the electric light shone in the center of a brilliantly-colored circle, composed of myriads of pencils of light, radiating from the dazzling central point. As the moisture evaporated the pencils became fewer and coarser, bright lines and fragments of lines, rather than pencils. A few breaths on the glass, more moisture condensed and again the pencils were in myriads. I enjoyed the small but brilliant view in the same spirit in which I enjoy the starry heavens on a grand mountain outlook.

As I looked I thought of many things. I thought of my own mind with its wondrous thinking machinery; I thought of my eyes and of their marvelous mechanism by which the brain received so much thought-producing material; I thought of the burning furnace within my body that sent out heated air laden with the invisible vapor of water; I thought of the laws of heat and cold by which that vapor was instantly condensed and became visible when it came in contact with the cold glass; I thought of the transparent glass and of all the changes it had passed

through since it was a mineral in the primeval rocks; I thought of the tree with its naked branches whose fibers were being toughened by constant wrestling with the wind; I thought of the leaves that in a few weeks would cover those twigs and conceal from me the electric light; I thought of the invisible air with its strange elements and properties, and of the laws of meteorology that produced the wind; I thought of the electric wire and of the distant copper mines from which it came; I thought of the mysterious force that we call electricity, of the coal, the engine, the machinery, that produce it, and of the light that it produces; I thought of the mysterious thing that we call light and of the laws of light that gave me those penciled rays; I thought of the things that were made for "glory and for beauty" as well as for practical utility; and I thought of God.

And so, according to such knowledge as I had of psychology, of physiology, of physics, of meteorology, of botany, of mineralogy, of chemistry, of optics, of electricity, of esthetics, and of natural theology, were my thoughts manifold, rich, suggestive, correlated, inspiring, spiritual even, in their last analysis.

That which to many would be a thing of no interest, a commonplace sight not worth a second glance, was to me full of beauty, tinged with glory, spiritually helpful, and an occasion for praising and worshipping God.

ROSELLE THEODORE CROSS.

LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO



THE BLACK-THROATED GREEN WARBLER.

(*Dendroica virens*.)

One of the interesting nature studies is an investigation of the groups of insect-eating birds in reference to their food and the methods employed in obtaining it. Some insects are useful to man, but by far the larger number are a detriment to his interests in one way or another.

The swallows and swifts are almost constantly on the wing, dexterously catching any insects that come in their way. They are day birds and at night are replaced by the nighthawks that feed upon the night flying insects. Next are the flycatchers that dart "from ambush at passing prey, and with a suggestive click of the bill, return to their post." The beautiful little hummingbird, ever active on the wing, quickly sees and picks from leaf or flower insects that would escape the attention of other birds. The woodpeckers and allied birds examine the tree trunks and carefully listen for the insect that may be boring through the wood within. The vireos, like the good housekeeper, examine the "nooks and corners to see that no skulker escapes." The robin and its sister thrushes and the numerous sparrows attend to the surface of the earth, and aquatic birds extensively destroy those insects whose development takes place either in or on the water.

Not the least among the birds that assist man in his warfare upon insect pests are our beautiful and active warblers that frequent the foliage of tree and shrubs patiently gathering their insect food.

One of these is the Black-throated Green Warbler of our illustration. If we desire to examine its habits, except during the period of migration, we must visit the forests of cone bearing trees in

the northern woods of the eastern United States, in the Allegheny mountains and from these points northward to Hudson Bay. It is almost useless to seek this bird in other places. Here, high up in the cedars, pines and hemlock in cozy retreats far out on the branches it builds its nest. "The foundation of the structure is of fine shreds of bark, fine dry twigs of the hemlock, bits of fine grass, weeds and dried rootlets, intermixed with moss and lined with rootlets, fine grass, some feathers and horse hair." The nests are usually bulky and loosely constructed. These rollicksome Warblers have a peculiar song which is very characteristic and not easily forgotten. The descriptions of this song are almost as numerous as are the observers. One has given this rendering: "Hear me Saint Ther-e-sa." Another has very aptly described it as sounding like, "Wee-wee-su-see," the syllables "uttered slowly and well drawn out; that before the last in a lower tone than the two former, and the last syllable noticeably on the upward slide; the whole being a sort of insect tone, altogether peculiar, and by no means unpleasing."

The song of the Black-throated Green Warbler is so unlike that of the other warblers that it becomes an important characteristic of the species. Mr. Chapman says, "There is a quality about it like the droning of bees; it seems to voice the restfulness of a midsummer day."

Those who wish to observe this bird and cannot go to its nesting retreats, in the evergreen forests, must seek in any wooded land during its migrations to and from the tropics, where it finds an abundance of food during the rigors of our northern winters.

A LIBEL ON THE BIRDS.

A few days ago I was watching the curious actions of a sparrow on the sidewalk in a rather quiet part of town. On either side of the street were lofty brick and stone buildings, with the usual multiplicity of little niches and cavities in and about the projecting cornices and ornamental architecture. These sheltered and inviting ledges had been utilized from year to year by divers smaller tribes of the feathered folk as nest-building sites, and the little bird which had attracted my attention had already laid the foundation timbers of its prospective house in a cosy niche of the cornice almost directly over my head where I was standing.

It was plainly evident that the sprightly creature was seeking sticks of proper length and strength to barricade a broad hiatus in the front part of the cavity it had chosen for its future home.

This opening was angular in form with the vertex at the bottom and its sides separating outwards towards the top, where there was a span of perhaps four or five inches.

As I stood with my elbow resting against the low paling the confiding sparrow hopped to within a yard or two of my feet in searching for tiny twigs that had fallen from the overhanging shrubbery.

It picked up a great many pieces and as quickly dropped them. Then it would stand perfectly still for a few minutes intently scanning the limited landscape as if in a brown study as to what move it should next make.

Finally it set vigorously to work picking up bits of material from an inch or two to six inches in length. Instead of flying away with a load it dropped them in a little heap nearly if not quite parallel to each other. Then poking its beak into the pile and throwing the sticks

hither and thither it settled down to practical business by seizing a stick of medium length and flying away with its burden dangling in the air. Of course, I watched the little architect and saw her mount straight up to the chosen ledge and deposit the twig exactly crosswise of the gaping notch. This operation she repeated several times, always throwing the sticks about as if intent upon selecting a piece of special dimensions. No human carpenter with measuring rule in his hand could have been more expert.

In a moment the truth flashed into my mind and I realized that I was verily the human pupil of a little bird made famous by honored mention in Holy Writ.

Why, the cunning worker had foreseen to the ridicule of my own confessed stupidity that in order to effectually bar the exposed side of the chamber it must of necessity select girders of successively increasing length and size. Thus, as I fancied it reasoned, a short stick would not span the top of the dangerous gap; while, on the other hand, a long stick could not be used at the bottom because it would strike smack against the side walls before it could be placed in position low enough. So all this clearly explained why the bird should exercise such studied care in selecting the large "timbers."

A few days afterwards I visited the scene of operations again, and by using an opera glass found that the nest was very nearly if not quite finished. The menacing gap in the ledge no longer existed; for there was a solid bulkhead in its stead composed of longitudinal sticks tied and stiffened by interwoven bits of dry grass and such shreds of various waste material as only bird intelligence knows where to find.

More interested now than ever, I took pains to climb into the attic of the three story building where from a narrow

gable window I could look obliquely down into the pretty nest now neatly lined with tiny feathers and thistle down. So much, then, for the sparrows and their house building. I say sparrows now, for during my later observations I had seen both Mr. and Mrs. Sparrow diligently working together.

But to advert now to our alleged "libel" on the birds, I have only to say that it is very convenient for great men and ponderous books to tell us that the lower animals perform their actions by means of a tendency called "instinct;" and thus divest themselves of all further responsibility in the matter. Confronted by this obscure declaration we are led as pupils in natural history to ask, "What is instinct?" The following definitions of this much-abused term are, perhaps, the best to be found in the English language:

"Instinct is a propensity prior to experience and independent of instruction."
—William Paley.

"Instinct is a blind tendency to some mode of action, independent of any consideration on the part of the agent, of the end to which the action leads."—Richard Whately.

"Instinct is an agent which performs blindly and ignorantly a work of intelligence and knowledge.—Sir William Hamilton.

Now such names as Paley, Whately and Hamilton stand high upon the roll of honor in the sparkling literature of our language; and yet the words of these

great scholars are but as sounding brass and a tinkling cymbal when they undertake to tell us what is the real import and inwardness of that occult and wonderful faculty in the mental essence of animals which scientists by force of circumstances have agreed to call "instinct."

"Aha!" my little sparrow would say, could she speak our language, "we perform our actions neither blindly nor ignorantly, as your famous Mr. Hamilton learnedly remarks; but God has taught us to both reason and work according to existing circumstances, from cause to effect; nay, even as your great logicians would have it, *a priori*. And although five of our little bodies were sold in the markets of Jerusalem for two farthings, not one of us ever fell to the ground without our Father's notice!"

There, that is about the kind of sermon our little bird would preach to the utter discomfiture of human wisdom, which, after all, is but "foolishness with God."

Verily, and in conclusion, we declare that it is a libel upon the birds to say that they build their nests guided only by that nameless tendency signified by the common acceptance of the term "instinct."

The humblest creature God has made
Fulfills some noble, wise design;
And, dowered rich with reason's aid,
It boasts a lineage divine.

L. P. VENEEN.

BERYL.

This mineral species includes a number of varieties which are highly valued as gems. These are, besides Beryl itself, the gems emerald, aquamarine and golden beryl. Chrysoberyl, it may be noted, is not a variety of Beryl, but a distinct species.

While these gems all differ in color, they are the same mineral and are practically identical in composition, hardness and other properties. In composition they are a silicate of aluminum and glucinum, the percentage being, for normal beryl, 67 per cent of silica, 19 per cent of alumina and 14 per cent of glucina.

The beautiful green color of the emerald is probably due to a small quantity of chromium which it usually contains, though some authorities believe organic matter to be the coloring ingredient. To what substance the other varieties of the species owe their color is not known.

In hardness the varieties of Beryl differ little from quartz, the hardness being 7.5 to 8 in the scale of which quartz is 7. They are somewhat inferior therefore to such gems as topaz, sapphire and ruby in wearing qualities, although hard enough for ordinary purposes.

The specific gravity of Beryl is also about like that of quartz, ranging from 2.63 to 2.80; the specific gravity of quartz being 2.65. The varieties of Beryl are therefore relatively light as compared with other gems.

Beryl crystallizes in the hexagonal system. It usually occurs as six-sided prisms, commonly terminated by a single flat plane, but sometimes by numerous small planes giving a rounded effect and occasionally by pyramidal planes which cause the prism to taper to a sharp point.

The crystals sometimes grow to enormous size, exceeding those of any other known mineral. Thus, one found in Grafton, New Hampshire, was four and

one-quarter feet in length and weighed two thousand nine hundred pounds. Another in the same locality is estimated to weigh two and one-half tons. In the museum of the Boston Society of Natural History and in the United States National Museum are exhibited single crystals also of great size. That in Boston is three and one-half feet long by three feet wide and weighs several tons. That in the National Museum weighs over six hundred pounds.

None of these crystals are of a high degree of purity or transparency, but the crystal planes at least of the prisms are well developed.

Beryl crystals have no marked cleavage except a slight one parallel with the base. Where broken, the surface shows what is called conchoidal fracture, i. e. it exhibits little rounded concavities and convexities resembling a shell in shape.

The mineral is quite brittle. Some emeralds even have the annoying habit of breaking of their own accord soon after removal from the mine. This can be prevented by warming them gradually before exposing them to the heat of the sun or other sudden heat.

Beryl and its varieties, like tourmaline, are dichroic, i. e. the stones exhibit different colors when viewed in different directions. This dichroism can sometimes be observed by the naked eye, but often not without the aid of the instrument known as the dichroscope. When seen it furnishes a positive means of distinguishing a true stone from any glass imitations.

The varieties of Beryl have none of the brilliancy of the diamond and therefore depend wholly on their body colors and their lustre for their beauty and attractiveness. Fortunately they exhibit these qualities as well by artificial light as by daylight.

Ordinary Beryl is a mineral of com-



Golden Beryl (Siberia).
Blue Beryl (Siberia).

BERYL.
Blue Beryl (Albany, Maine).
Aquamarine (Conn.)
Golden Beryl (Conn.)

Copyright 1908 by J. W. MUMFORD, CHICAGO.
Aquamarine (Ural Mountains).
Emerald in the Matrix (Ural Mountains).

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

paratively common occurrence, being often found in granitic and metamorphic rocks.

That of common occurrence is usually too clouded and fractured to be of use for gem cutting. There are many localities, however, where Beryls of gem quality occur.

The finest emeralds in the world come from Muso, a locality in the United States of Colombia, seventy-five miles N. N. W. of Bogota. It is a wild and inaccessible region and the mining of the gems is a precarious occupation. The emeralds occur according to Bauer in a dark, bituminous limestone which is shown by fossils to be of Cretaceous age. As emeralds in other localities occur only in eruptive or metamorphic rocks, it seems probable that the Muso emeralds have washed in from an older formation. The emerald bearing beds are horizontal, overlying red sandstone and clay slate. Calcite, quartz, pyrite and the rare mineral parisite are other minerals found associated with the emerald. The manner of working these emerald mines is thus described by Streeter:

"The mine is now worked by a company, who pay an annual rent for it to the government, and employ one hundred and twenty workmen. It has the form of a tunnel of about one hundred yards deep, with very inclined walls. On the summit of the mountains, and quite near to the mouth of the mine, are large lakes, whose waters are shut off by means of water-gates, which can be easily shifted when the laborers require water. When the waters are freed they rush with great rapidity down the walls of the mine, and on reaching the bottom of it they are conducted by means of an underground canal through the mountain into a basin. To obtain the emeralds the workmen begin by cutting steps on the inclined walls of the mine, in order to make firm resting places for their feet. The overseer places the men at certain distances from each other to cut out wide steps with the help of pickaxes. The loosened stones fall by their own weight to the bottom of the mine. When this begins to fill, a sign is given to let the waters loose, which rush down with great vehemence, carrying the fragments of rock with them through the mountain into the basin. This operation

is repeated until the horizontal beds are exposed in which the emeralds are found."

The next most prominent locality whence gem emeralds are obtained is that in Siberia on the river Tokovoya, forty-five miles east of Ekaterinburg. The emeralds here found are often larger than any yet obtained in South America, but they are not of so good quality. They occur in mica schist (see colored plate), and often associated with the mineral phenacite, chrysoberyl, rutile, etc.

Other localities whence emeralds are obtained are Upper Egypt (the source of those known to the ancients), the Heubachthal in Austria, and Alexander county, North Carolina, in our own country. The latter locality is no longer worked, but it has afforded a number of fine crystals.

Aquamarines and transparent Beryls are found in Siberia, India, Brazil, and in many localities in the United States. Dana describes an aquamarine from Brazil which approaches in size, and also in form, the head of a calf. It weighs two hundred and twenty-five ounces troy, is transparent and without a flaw. In the Field Columbian Museum is to be seen a beautiful cut aquamarine from Siberia more than two inches in diameter and weighing three hundred and thirty-one carats. Here is also the finest specimen of blue Beryl ever cut in the United States. It was found in Stoneham, Me., is rich sea green color in one direction and sea blue in another. It weighs one hundred and thirty-three carats. Numerous other Maine localities have furnished gem Beryls. Golden Beryls are found in Maine, Connecticut, North Carolina, Pennsylvania and other United States localities, as well as in Siberia and Ceylon. From them are obtained gems of rich golden color resembling topaz.

Beryl of a pale rose color is sometimes found, and when of good quality is cut for gem purposes, but it is of too rare occurrence to be important.

Emeralds seem to have been known and prized from the earliest times. They are mentioned in the Bible in several places, the earliest mention being in Exodus, where they are described as one of the stones making up the ephod of the high priest.

Their use in Egypt dates back to an unrecorded past and they frequently appear in the ornaments found upon mummies. Readers of Roman history will remember that the Emperor Nero used an emerald constantly as an eye glass.

The Incas, Aztecs and other highly civilized peoples of South America were found using these gems profusely for purposes of adornment and for votive offerings when first visited by the Spaniards. It was partly the desire to secure these gems which led Cortez and his followers, early in the sixteenth century, to undertake the conquest of Peru. Some of the emeralds wrested from the Incas by Cortez and brought to Spain are said to have been marvels of the lapidary's art. One was carved into the form of a rose, another that of a fish with golden eyes, and another that of a bell with a pearl for a clapper.

During the years following Cortez' conquest large quantities of emeralds were brought to Europe, and they became much more popular and widely distributed than previously. Joseph D'Acosta, a traveler of the period, says the ship in which he returned from America to Spain carried two chests, each of which contained one hundred pounds' weight of fine emeralds.

From what locality the Peruvians themselves obtained these gems is not known, unless it was the Colombian locality at Muso, already described. The Spaniards were led to these mines in 1558. They continued the working of them, and there has been practically no interruption in their operation since that time.

The ancients had many superstitions regarding the emerald, one being that it had a power to cure diseases of the eye. Another was that it would reveal the inconstancy of lovers by changing color.

"It is a gem that hath the power to show
If plighted lovers keep their troth or no.

If faithful, it is like the leaves of Spring;
If faithless, like those leaves when withering."

So writes one poet.

Again, they believed the emerald would blind the eyes of the serpent:

"Blinded like serpents when they gaze
Upon the emerald's virgin blaze."

—Moore.

Of these traditions, perhaps the only one held in any esteem at the present time is that which associates the emerald with the month of June, making it the talismanic gem or "birth stone" of persons born in that month.

The largest and most beautiful emerald known to be in existence at the present time is one owned by the Duke of Devonshire. This is an uncut six-sided crystal about two inches long and of the same diameter. It is of perfect color, almost flawless and quite transparent.

Like all other gems, the value of emeralds varies much according to their perfection. Those of the best grade are worth at least one hundred dollars a carat. The color should be a dark velvety green, those of lighter shades being much less valuable. Owing to the extreme brittleness of the mineral, emeralds usually contain flaws, so that "an emerald without a flaw" has passed into a proverb to indicate a thing almost unattainable.

Aquamarine and other varieties of Beryl seem not to have been as highly esteemed as emerald by the ancients, although Beryl is mentioned in the Bible, and early writers describe gems evidently belonging to the species. They were probably less well known to the ancients, as nearly all the localities from which aquamarines and Beryls are now obtained are of comparatively modern discovery. They are gems in every way as worthy as the emerald, however, and will doubtless become more popular as their qualities are better known.

OLIVER CUMMINGS FARRINGTON.

SONG BIRDS OF THE SOUTHWEST.

"A pleasing land of drowsy-head it was,
Of dreams that wave before the half-shut eye."

"New birds, new flowers, new pleasures," I murmur as my vision widens upon the, to me, new world of Arizona. A new delight indeed, notwithstanding the often impressed fact that the old foot-path-ways of Ohio are, after many years, still but half discovered countries. But 'tis human, this desire for novelty, and I am not at all in advance of my fellow kindred in arriving at that stage of blessed content which we see expressed upon every side of us in the lives of the lesser (?) creatures who abide without unrest until compelled by the necessities of necessity to "move on." But I echo Richard Jefferies: "a fresh flower, a fresh path-way, a fresh delight," and am so far content; and, truly, coming from the east of living greens, 'tis a new kingdom of somber mountains and sandy desert at which I have arrived. To an imaginative person it is a land filled with the echoes of a distant past, even now but half heard and in my mind the golden glow of a day that is dead enfolds the silent hills, a silence of grandeur, not of nature which is here alive and keen to the fullest extent. With many other naturalists, I agree that if one desires to learn the secrets of the field and forest, one must go about singly and alone. There is something strange about it too, while one person alone is allowed to see many of the inner movements of wild life, when two or three are gathered together, they seem to intimidate the wood folk to an unlimited extent.

But bird life in this far away territory, notwithstanding Dr. Charles Abbott's experience to the contrary, seems to me to be much more companionable and less timid than in the more thickly populated east, and also, bird curiosity is more noticeable than in those states where generations of experience has obviated all desire for any close scrutiny or investigation of that queer biped without feathers. One has only to sit silent and quiet for a few moments to have his ornithological interest aroused by numerous visitors, who, with impatient "chips" and "twits" question his presence among them. While

Gila county makes up her quota of song birds in quantity, she lacks something in decorative quality, at least so far as coloring of plumage is concerned. There is no question but what the very arid atmosphere of this section is not without its marked effect upon feather coloring, and on account of this dullness of plumage, I was at first unable to classify numbers of birds who were perfectly familiar to me in Ohio. Birds like the blue jay lose much of the metallic gorgeousness of their plumage and are under a veil as it were, showing a dull, bluish gray. The blackbirds also are decidedly rusty in appearance, hardly holding their own with the great glossy ravens (*Corvus principalis*) who have so adapted themselves to civilization as to have become almost a necessity as purveyors of edible refuse and debris which accumulates in such abundance about the abodes of mankind, who are supposedly the most hygienic and cleanly of all creatures, but whose abiding places 'au natural' present an unsightly spectacle in comparison with the nests of birds, but of course it is because our requirements are so much greater, and education has developed a love of "accumulations" among us, herein must lie all blame. But we "progress" or so we have determined.

However, I never see these dignified crows of stately motion moving about without remembering Virgil's:

"The crow with clamorous cries the shower demands,
And single stalks along the desert sands."

But in Arizona his demand for showers is vain, for the absence of the "rain maker" is her greatest deficit.

To return to the atmospheric or arid effect upon color, I fail to understand why the bleaching process is so observable in feathers, yet the most brilliant and tropical coloring predominates in the flora. Does the plant world absorb all of the richest coloring matter of the sunlight, or do they possess an antidote to the alkaline properties of the air? Is at-

mospheric moisture that is not obtainable necessary in feather coloring? Some of the plants here are sufficient unto themselves, brewing their own sustenance as it were, as I have seen the Bisnaga, sometimes called "Well of the Desert" in which a deep hole had been cut, produce in a short time at least a cup full of watery liquid, which is very invigorating to the thirsty traveler, and growing, too, in a sand as dry as powder, there not having been a drop of rain near it in months, if not years, and dew an unknown quantity. This liquor seems necessary for the full fruition of the rich, yellow flower, so carefully guarded by immense fish-hook spines or barbs that is such efficient protection to this species of cacti. As effectual is this protection as is the venomous reputation of that much maligned saurian, the Gila monster (*Heloderma suspectum*), which is not one-half so bad as his looks would imply, but he is formidable in appearance when he puffs forth his breath like a miniature steam engine and at the same time emits a greenish saliva from his mouth, which is to say the least a forbidding performance, but I really believe him to be comparatively harmless, for after considerable acquaintance with his habits, I have only learned of one person being bitten by this reptile, and that was a man who was drunk and insisted upon tickling the Gila monster on the mouth and was bitten for his pains. The reptile had to be killed before its teeth could be unlocked. As an antidote an attempt was made to fill the man with whisky, but as he was already full but little could be accomplished in that line; when he got sober he was all right save that his hand was somewhat paralyzed.

There is a marked gregariousness among the song birds of Arizona or else the present abundance of all species gives one that impression, for the numbers are almost countless, though human depredators are fast depopulating the songsters for the sake of their own pleasure or bird plumage for profit. While women anathematize men for their inordinate desire to kill something, they take an equivocal stand as critics, yet wearing a hat adorned with one or more dead bodies of birds. It is truly the old question of mote and beam re-enacted.

I do not remember of meeting with but one bird which I have been entirely unable to classify or even learn its common name if it has one. It darts in and out of a thorn bush after the manner of a thrasher or cat bird, and about equals them in size; is of a dull canary yellow in color save for a rich red cap slightly tufted and worn jauntily on top of his head. I have never heard any note from him save a startled chip, and have been unable to learn anything about him from the various bird histories.

Dr. Abbott has remarked on the lack of vocal powers among the birds of Arizona, and says:

"I listened hour after hour to these cheerful birds, fancying there was melody in their attempts at song, and wondering why, when their lines had been cast in such forbidding places, the gift of sweet song had not been vouchsafed them. Does the extremely dry atmosphere have to do with it? Not a sound that I heard had that fulness of tone common to the allied utterances at home. At the limit of my longest stroll I heard a mountain mocking bird, as it is misnamed in the books, and his was a disappointed song. It was the twanging of a harp of a single string, and that a loose one."

This absence of note richness is a feature that I have not observed, and never have I heard a more musical chorus from bird throats as one after another of the many sorts and conditions awoke at sunrise. Many a time have I listened while camping on a lone mountain-top, where our only canopy was the pine fretted blue heavens, and heard the rich burst of song in which not a note lacked flavor; mocking birds, thrushes, orioles, wrens, finches, vireos, grosbeaks, robins (and their distinguishable note is likely to make one homesick) thrashers, blue birds, tanagers, etc., all filling in the score, as each was awakened and filled in the line of song, to say nothing of whip-poor-wills, owls and other night singers who have had "their day." I feel sure if Dr. Abbott had given a little more time to the study of bird song in this territory he would have had no cause to complain of or discredit the vocal powers of these western songsters.

ALBERTA A. FIELD.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



AFRICAN LION.

Copyright 1904

Copyright 1904, by A. W. Hume, Chicago.

THE AFRICAN LION.

(*Felis leo.*)

The African Lion, familiar to the general public as the sulky tenant of a barred cage, ranges with freer strides throughout the length and breadth of Africa, and even extends through Persia into the northwestern part of India. Fossil remains show that at one time *Felis leo* inhabited the southern part of Europe as well, but the king of beasts was evidently considered good sport by primitive man, and he became extinct in Europe except where, in the Roman amphitheatres, and in many a meaner cage since, he has roared for the edification of the populace.

The literature of all nations is full of allusions to the Lion; to his bravery, his grandeur and his strength. The old Assyrian kings carved pictures of themselves in bas relief hurling javelins into crouching Lions, and many a sportsman is to-day beating the thorn-thickets and trailing over the sandy plains of Africa with the same unreasoning enthusiasm, yet hoping, perhaps, in a vague way to hand down his name along with the Assyrian kings by writing a book. It is the Lion's misfortune as well as his glory that he is king of beasts.

The Lion differs from the other *Felidæ* in the great strength and massive proportions of his head and shoulders, and more especially in the arrangement and growth of the hair on the body. Where, in other cats, the hair lies flat and close along the skin, the Lion is so clothed only on his yellowish-brown body. The hair of the top of the head and of the neck to the shoulders stands erect or bristles forward, forming the beautiful and characteristic mane of the adult male and suggesting in a way not otherwise possible the massive strength of the great paws, one blow from which will fell an ox or crush the skull of a man without an effort. In most Lions the mane is of a darker color than the remainder of the body, being often al-

most black. The elbows, tip of tail and the under parts of the body are also clothed with this long, bristly hair, but it is found only on males above three years of age. The females have smaller heads and shoulders and are of a uniform color.

In many minor ways the Lion is specially adapted for his predatory life. Every tooth in his head is sharp pointed or sharp edged. The great canine teeth are set far apart in his square jaws and locked together like a vice. The molars are transformed from grinders into incisors, yet are so strong that they will crack heavy bones. The papillæ on the tongue are so developed that they resemble long, horny spines curved backwards, giving the tongue the appearance of a coarse rasp. With this rough tongue the Lion can lick the meat from bones as easily as a house cat eats butter, and should a friendly Lion lick his keeper's hand the flesh would be torn and the blood flow. The claws are very large and sharp, and are so nicely sheathed in the soft cushions of his feet that the Lion neither blunts nor wears them down. Yet when he strikes with tense paws every claw is like a hook and a dagger to tear and cut.

In seeking his prey the Lion lies in wait by springs and water holes and leaps upon his victims from the ambush of some bush or rock as yellow as his own tawny hide; or, failing in this, he sneaks up the wind and through the thickets and reeds of a watercourse or swamp and quickly leaps upon a surprised antelope or zebra or savage buffalo, crushing it to the ground by his great weight, while he strikes and tears it with paws and teeth. In cultivated districts the Lion prowls about the fields and villages, seizing cattle and sheep, and often, when he is old and lazy, rushes into some camp or hut at night and carries off a man. In many parts of Africa the natives build great

corrals of thorns about their camps to keep the Lions away, and should one be heard in the night they light fires and wave torches until the dawn.

Under ordinary circumstances the Lion attends to his own hunting, and when seen in the daytime retreats to some denser cover where he will not be disturbed. This is often cited as an evidence of cowardice, but is such a common characteristic of big game and of animals, and even men of undoubted courage, that it should not be held against him. There is no animal in the world which can consistently hunt for trouble and survive, and so long as the Lion can keep his stomach filled and his sleep undisturbed he is probably content to waive the title of king of beasts.

Lion hunting has been held a royal sport in all times, with the result that the Lion has been exterminated in many parts of its natural habitat and forced back into the wilder parts of desert and plain. Unlike the tiger, the Lion is rarely found in forests, and is unable to climb trees. He is ordinarily stalked in the daytime, when, with stomach full, he sleeps among rocks and bushes, or shot from stands as he approaches some water hole or carcass by night. The literature of African exploration and travel abounds with accounts of Lions killed by men and men killed by Lions. In these days of zinc balls and repeating rifles it is generally the Lion that is killed. To the thorough-paced English sportsman like Sir Samuel Baker or Gordon Cumming the Lion hunt is recreation merely, and with their ten-bore rifles and British phlegm they are in no more danger than if they were chasing foxes through the dales of England.

The family life of the Lion is very interesting and human. So far as is known, a single male and female remain together year after year, irrespective of the pairing season, the Lion feeding and caring

for his Lioness and cubs and educating the young in the duties of life. For two or three years the cubs follow their parents, so that Lions are often found in small troops. Cases have been reported where they have joined for a preconcerted hunt, and the Lioness often goes up the wind to startle game and drive it towards her ambushed mate, following after for a share of the prey. Hon. W. H. Drummond, in "The Large Game and Natural History of South and Southeast Africa," gives the following account of the feast after the victim had been slain: "The Lion had by this time quite killed the beautiful animal, but instead of proceeding to eat it, he got up and roared vigorously until there was an answer, and in a few minutes a Lioness, accompanied by four whelps, came trotting up from the same direction as the zebra, which no doubt she had been to drive towards her husband. They formed a fine picture as they all stood round the carcass, the whelps tearing it and biting it, but unable to get through the tough skin. Then the Lion lay down, and the Lioness, driving her offspring before her, did the same, four or five yards off, upon which he got up and, commencing to eat, had soon finished a hind leg, retiring a few yards on one side as soon as he had done so. The Lioness came up next and tore the carcass to shreds, bolting huge mouthfuls, but not objecting to the whelps eating as much as they could find. There was a good deal of snarling and quarreling among these young Lions, and occasionally a standup fight for a minute, but their mother did not take any notice of them except to give them a smart blow with her paw if they got in her way. There was now little left of the zebra but a few bones, and the whole Lion family walked quietly away, the Lioness leading, and the Lion often turning his head to see that they were not followed, bringing up the rear."

DANE COOLIDGE.

TROUTING BAREFOOT.

'Twas a holiday joy when I was a boy,
To follow the brook a-trouting,
'Twas gold of pleasure without alloy,
To trudge away through the livelong day—
Not a bite to eat, or a word to say,
And never a failing or doubting.
Then home at night in a curious plight—
Heavy and tired and hungry quite—
With a string of the “speckles” hung out of sight,
And a chorus of boyish shouting.

Only a line of the commonest twine,
Only a pole of alder;
None of your beautiful things that shine—
Tackle so nice and so high in price
That a trout would laugh to be taken twice.
And sing like a Swedish scald
For a jump at a sign of a thing so fine,
And scorn rough implements such as mine;
Only a line of the commonest twine—
Only a pole of alder!

Wet to the skin in our raiment thin—
Never a word of complaining,
Never too late in the day to begin;
Dropping a hook in the beautiful brook
Till day was taking his farewell look
No matter how hard it was raining!
Ah! few, indeed, would fail to succeed
In the angling of life—if they'd only heed
The trout-boy's patience, whatever impede,
And his joy, both in seeking and gaining.

—Belle A. Hitchcock.

THE ALASKAN MOOSE.

(*Alces gigas*.)

The Alaska Moose is the largest of the deer family in America. *Alces gigas* is a comparatively new species, having been described in 1899. At present it is still quite numerous along the Yukon and its tributaries, though the influx of prospectors and the settling of the Klondike region has already resulted in a marked falling off in Moose and an increase of Moose meat. In the winter this is the staple diet of both Indians and whites, and on account of the high price paid—one dollar or two dollars per pound—many prospectors have found Moose hunting even more remunerative than mining.

Alces gigas was first collected by Mr. Dall De Weese, of Canon City, Colo., who spent three months, in 1898, on the Kenai Peninsula, Alaska, in quest of large mammals for the United States Museum. From the six specimens of the Alaskan Moose which he collected it is seen that this animal differs considerably from the Moose (*Alces americanus*) inhabiting the east United States and eastern and central Canada, being larger and more richly colored and having a much heavier mandible. Its general color is a grizzle of black and wood brown, darkening along the spine and changing abruptly to clear black on chest, buttocks and lower part of sides.

The horns of the Moose are very characteristic, being of immense size and palinated before and behind so that an average full-grown pair weighs seventy pounds and shows a spread of forty-six inches between the points of the posterior branch as against a length of thirty-eight inches. Our illustration is a photograph of one with horns of remarkable size, measuring about seventy-one inches from tip to tip in a line across the head. It is not until the third year that the horns are palmated, and they increase in size from year to year. In the winter the old horns are cast, but they sprout again in

the spring, and by June have shed their velvet and appear a beautiful white. Although so large and characteristic, it is not known that they serve any more useful purpose than as weapons during the rutting season. In running through the woods the Moose throws his head back, and, despite the spread and weight of his horns, he is able to move about without breaking a twig.

The clumsy shape of the head is accentuated by the hump on the nose, which is due to the excessive development of the nasal septum and of the upper lip, which is long and supple, and adapted to browsing rather than to cropping grass. The short neck of the Moose would in any case interfere with the cropping of grass, even if it were found in the snowy inland of Alaska. Its common food is the twigs and bark of willows and birches, which it rides down to reach the tops, lichens and mosses and the aquatic plants of summer.

In winter the Moose herd together in the snow, forming great tramped-down places called moose yards by hunters. In summer comes the rutting season, in which the great males shake their antlers and attack any animal that comes their way. With summer comes mosquitoes also, and these pester the Moose to such an extent that they are galled to a greater fury. So it is that the Moose is a most dangerous animal in the time when the ground is clear, the swamps full of mosquitoes and his horns new-stripped of velvet for the fray.

When the snow lies so deep that he cannot travel even with his long legs, the enemies of the Moose have him at a disadvantage, and often the yards are attacked by wolves or bears or, worse yet, by agile men on snowshoes. Killing in the snow is not recognized as legitimate sport, and is resorted to only by skin hunters or men lacking in the higher



LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

ideals of sportsmen. The ordinary method of hunting deer in the summer is by imitating the rutting cry of the male, the reply of the cow and the defiant challenge of the male again, followed by the thrashing and scraping of the trees and branches where the hunter lies concealed. These cries are produced by blowing through a birchbark horn, and on account of the blind fury of the rutting males they are often very successful in bringing them to their death.

The Indians and half-breeds of the far North stalk the wary Moose where he beds himself down after a night of browsing, but so acute is his hearing and sense of smell and so great his cunning that only the trained woodsman can hope for success. Leaving his feed-trail abruptly, the Moose moves off to one side down the wind so that any one trailing him will be surely scented, and there beds himself down for the day. The Indian follows the well-defined trail of the Moose until it becomes fresh, and then by a series of circuits down the wind and leading back to the trail, like the semicircles of the letter B, he gradually approaches the hiding place until at last, coming up the wind, he sights his prey and, startling it by a slight sound, shoots it where it stands.

The young are brought forth in the early summer and stay with their mother until the third year. During this time she defends them with the greatest ferocity from man and wild-animals alike, using her sharp hoofs in striking out at wolves and men, often trampling them into the snow in her fury. The new-born young are very helpless at first on their long, tottering legs, and, roaming as they do in a wild land of wolves and beasts of prey, they could scarcely survive at all without the protection of their mother's knife-like hoofs. So long and awkward are the legs of Moose that in running through the woods the hind feet often interfere with the fore feet, throwing the clumsy animal in a heap. The falling of Moose while running was considered so unaccountable at first that it was assigned to attacks of epilepsy, but it has since been discovered that when galloping the Moose spreads his hind feet far apart in a more or less successful effort to avoid tripping up his fore feet. But when we consider his load of horns and the fallen trees and broken branches of his native haunts it is a marvel that he is able to outrun his foes at all, whereas the Moose is in fact the swiftest animal in the Northern woods.

DANE COOLIDGE.

There's a wonderful weaver
High up in the air,
And he waves a white mantle,
For cold earth to wear.
With the wind for his shuttle
The cloud for his loom,
How he weaves! How he weaves!
In the light, in the gloom.

—Wayne Whistler, in the Record-Herald.

THE AUTOBIOGRAPHY OF A DUCK.

FOUNDED UPON FACT.

"How queer, my child! what a long, broad mouth you have, and what peculiar feet!"

It was my mother, a big brown hen, who spoke. I had stepped from my egg, only a short while before, and as I was the only one hatched out of the whole thirteen, my poor mother was greatly disappointed.

Now, to add to her troubles, there seemed to be something very peculiar about my appearance.

"Yes," she went on still watching me critically, "I have raised many families, but never a chick like you. Well! well! don't cry about it. Your yellow dress is very pretty. It doesn't pay to be too sensitive, as you will find, I am afraid, when you have lived with these chickens. Some of them are dreadfully trying. Dear! dear! how stiff I am! This setting is tiresome work."

"I wonder what sort of home we are going to have."

Our home, into which we moved a few hours later, proved to be an upturned soap box. Seven little chickens were there before us.

"The same old story," said my mother with a knowing air. "People imagine we hens have no sense. I did not hatch those chickens, but I am expected to care for them, as though I did. Some mothers would peck them so they would be glad to stay away."

She had too good a heart for this, however, and I was very glad to have these brothers and sisters.

They were different from me, though, in many ways, principally, in their dislike for water. They hated even to get their feet wet, while I dearly loved to get in the pond, and swim around on its surface, or even dive down to the bottom, where such nice fat worms lived.

My poor mother never could understand my tastes. The first time she saw

me on the water, she came rushing towards me, screaming and beating her wings.

"Oh, my child! my child!" she cried, with tears in her eyes. "You will drown! You will drown!"

I loved her, and so could not bear to see her distress. It was hard to be different from all the others.

I had a little yellow sister who was a great comfort to me at these times. I could never persuade her to try the water,—but she always sat upon the edge of the pond while I had my swim. We shared everything with each other; even our troubles.

About this time, my voice began to change. It had been a soft little "peep," but now it grew so harsh, that some of the old hens made unpleasant remarks about it, and my mother was worried.

"It isn't talking. It's quacking," said an old, brown-headed hen who was always complaining of her nerves.

She was very cross and spent most of her time standing on one leg in a corner and pecking any poor chicken that came in her reach.

"Don't you know why it's quacking?" asked a stately Buff Cochin who was a stranger in the yard; having arrived only that morning. "That child isn't a chicken. She's a duck."

"What you giving us?" said a dandified Cock, who was busy pluming his feathers. "Whoever heard of a duck?"

"Not you, I daresay," answered the Buff with a contemptuous sniff. "It's easy to see you have never been away from this yard. I have traveled, I would have you understand, and I know a duck, too."

"Well, I don't care what you call her," snapped the cross one. "I only hope she'll keep her voice out of my hearing. The sound of it gives me nervous prostration."

As for poor me,—I stole quietly away, and went up into a corner of the chicken

house to cry. I was a duck, alas! and different from all about me. No wonder I was lonely.

My mother asked the cause of my trouble, and when I told her she looked sad and puzzled. "I don't know what a duck is," she sighed, "things have been strangely mixed. But cheer up. Whatever comes you are still my child."

That was indeed a comfort to me. For never had chicken or duck a better mother.

There was consolation also, in what the kind old Buff Cochins told me.

I had nothing to be ashamed of, she said, for ducks were much esteemed by those who knew them.

From her this had more weight, for we all regarded the Buff Cochins as very superior. They were well born, and well bred, and had seen life in many places. Their husband, too, was a thorough gentleman.

However, he also was having his troubles now. He was losing his old feathers, and his new ones were long in coming. Consequently, his appearance was shabby, and he staid away from the hens.

Poor fellow, he looked quite forlorn, leaning up against a sunny corner of the barn, trying to keep warm. I believe he felt the loss of his tail feathers most for the young roosters who strutted by in their fine new coats, made sneering remarks about it.

I was very sorry for him, but my own troubles were getting to be as much as I could bear; for just when I needed a sympathetic mother she was taken from me and her place filled by a big, bare-headed hen as high tempered as she was homely.

"Raising a duck," she said with a contemptuous sniff at me. "I never supposed I'd come to that. Well, I'll keep you, but understand one thing, don't go quacking around me, and don't bring your wet and mud into the house. I'm not your other mother. My children don't rule me. I won't have that Mrs. Redbreast saying my house is dirty. There's no standing that hen anyhow. I'll give her my opinion if she puts on her airs around me. There's too much mixture here. One can't tell where breed begins or ends."

It was not many days later, before my mother and Mrs. Redbreast came to words and then blows. The cause was only a worm, but it was enough. Mrs. Redbreast insisted that it was hers. My mother thought otherwise, and with a screech of defiance rushed upon her enemy. Dust and feathers flew. We children withdrew to a safe distance, and with necks stretched watched in fear and trembling.

The fight, though fierce, was short. Our mother was victorious, but she had lost the tail feathers of which she had been so proud, and I am sure she never forgave Mrs. Redbreast.

Like children, chickens and ducks grow older and bigger with the passing days.

In time we were taken from our mothers and put to roost with the older hens and cocks. I was not made to roost so I spent my nights alone in a corner of the chicken house.

It was quieter down there—for up above the chickens all fought for best place, and their cackling and fluttering was disturbing.

The old gentleman was very heavy. Not only was it hard for him to fly up to the roost, but equally hard for him to hold on when once there. Yet I could never persuade him to rest on the floor with me. Like his kind, he preferred the discomfort of sleeping on a pole—a taste I cannot understand.

I was four months old before I saw one of my own kind. Then, one day three ducks were brought into the yard. They did not seem to mind being stared at, but fell to eating corn and talking among themselves.

"Horribly greedy," said Mrs. Redbreast. "I for one don't care to associate with them."

"Now you know what you look like, old quacker," snapped the cross hen, with a peck at me. "My poor nerves will suffer sadly now."

These unkind remarks scarcely disturbed me, however. There was a new feeling stirring in my heart. I am afraid you will have to be a duck, and live a long time without other ducks, to understand it. Here were companions, whose natures and tastes were like mine, and I was content.

LOUISE JAMISON.

A LOST FLOWER.

More than a hundred years ago a new flower was found in the wild and rugged mountains of North Carolina by Michaux, a Frenchman, who had traversed many lands and known many perils and adventures in his search for rare plants. He had traveled through his native country and Spain, climbed the Pyrenees, crossed sea and desert, been despoiled by Arab robbers, so that he arrived in Persia with nothing but his books left to him of his baggage. Luckily he cured the Shah of an illness, and was allowed to carry back to France many Eastern plants. He was then sent by his country to explore the forests of North America. In the mountainous country of North Carolina there were no roads, only Indian trails, traversed by a few missionaries and traders. In this wild and lonely region he found a new flower, that belonged to no recognized genus, and was mentioned by no previous botanist. It was a modest little flower; its pure white cup rises on a wand-like stem in the midst of shining and tender leaves, round in shape and prettily edged. He secured a specimen, but he had no leisure to study its habits in the "montagnes sauvages," as he called these mountains in his own language. Rumors reached him of the French Revolution, and he immediately hastened to return home. He was shipwrecked on the voyage and lost nearly all his collections.

From this time the flower was lost, so far as any knowledge of its existence was concerned. But after the death of Mi-

choux, our botanist, Dr. Asa Gray, happened to be in Paris with the son, the younger Michaux, also a lover of plants. Very naturally Michaux showed his American guest his father's new specimens of American plants that had escaped the shipwreck, and Dr. Gray was much interested in this little flower, marked "Unknown."

When he returned to the United States he sought it in vain. All trace seemed to have disappeared. Year after year when he heard of anyone going to the North Carolina mountains he would beg the person to look for the lost flower.

At last, someone, by chance, found a blossom, in early spring, growing in a different locality, and not recognizing its genus or species, sent it to Dr. Gray, as one of the highest botanical authorities.

As soon as Dr. Gray saw it he exclaimed, with delight: "Why, this is the little unknown flower of Michaux."

After its strange disappearance of a century it had again come to light. It has since been found in various parts of upper South Carolina, and is now cultivated by more than one florist and grower of rare plants. Its leaves are like those of the southern wild flower, the Galax, akin to the Pyxie or flowering moss, so it has been placed in the same family and named *Shortia galacifolia*, i. e., with a leaf like Galax. The first name is given in honor of Short, the botanist, a lovely way of keeping alive the remembrance of one who loved flowers.

ELLA F. MOSBY.

LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO

THE POLAR BEAR.

(*Ursus maritimus.*)

The Polar Bear is the only aquatic member of the family being often called Sea Bear, as the scientific name (*Ursus maritimus*) signifies. It is practically confined to the arctic zone, although various unwilling visitants have come as far south as Iceland and Newfoundland on the floating cakes of ice. In size the Polar Bear ranks next to the grizzly, with a doubt, perhaps, in his favor. He has the longest neck of any bear and finds it very useful in catching seals and fish under water. The coat is a silvery or creamy white, very long and thick, as might be expected in an animal which swims about in the Arctic Ocean and rests upon cakes of ice. The soles of the feet are very long and are covered with thick fur, which gives it a large unslippery surface, and enables it to climb over ice with facility.

The food of the Polar Bear consists principally of fish and seals, but the walrus often falls a prey to his strength and cunning, and when starved this Bear is known to eat marine grass in large quantities. Carcasses stranded on the beach, dead whales and marine animals afford him an opportunity to gorge himself to the utmost and make enough fat to keep out the chill of arctic waters. So fat do these great bears become that the pregnant female is able to bury herself in the snows of winter and hibernate, at the same time suckling her cubs until spring. The males do not hibernate, but may be seen all winter.

In hunting seals the Polar Bear enters the water at some distance from where his prey is basking on the ice and swims with great rapidity toward it, keeping well under water and raising the tip of his nose to the surface at intervals for breath. At last it rises beneath and in front of the seal and strikes it where it lies, or if it escapes into the water, cap-

tures it with ease, for he is a very rapid and expert diver. One has been known to dive from a block of ice and capture a passing salmon as deftly as a kingfisher catches a minnow.

In Greenland the Polar Bear is known to swim from island to island along the shore, eating the eggs and young of the innumerable birds which nest there.

Jacques Cartier, the French navigator, in the narrative of his voyage to Newfoundland in 1534 gives a wonderful account of the Polar Bear's fondness for birds and eggs and the efforts which he will make to procure them. An "Island of Birds" was discovered off the coast of Newfoundland, "and albeit the sayd island be fourteen leagues from the maine-land, notwithstanding beares come swimming thither to eat of the sayd birds, and our men found one there as great as any cow, and as white as any swan, who in their presence leapt into the sea, and upon Whitsun Munday (following our voyage to the land) we met her by the way, swimming toward land as swiftly as we could saile. So soon as we saw her we pursued her with our boats, and by maine strength tooke her, whose flesh was as good to be eaten as the flesh of a calf of two yeares old." Captain Sabine reports having seen a Polar Bear swimming strongly forty miles from land and with no ice in sight upon which to rest, so the statement of Cartier is perhaps true. Very few cows weigh fifteen hundred pounds, but this is the recorded weight of Polar Bears, "as great as any cow," killed by whaling crews in the arctic seas.

In hunting the Polar Bear the Eskimos usually pursue them with dogs and having surrounded them, kill them with spears and harpoons, while they fight the dogs. In the water the Polar Bear is generally able to escape by swim-

ming and diving and often it happens that by his strength and quickness he overturns boats and mangles the occupants before they can be rescued. The skin and fat of the Polar Bear are more valued by the natives of the north than his flesh, which is both fibrous and strong in flavor. The members of various arctic expeditions have been glad to eat it, however, Dr. Kane in particular, having had his life and that of his comrades preserved for some time by the meat from the carcass of a great bear, which fell into a trap baited simply with an old and greasy stocking. Whenever possible his men shot the bears on the ice, and many pathetic scenes were witnessed by them when the mothers of cubs were killed or when the cubs being slain, their mother refused to leave their bodies, even when wounded. So great is the affection of these bears for each other that when one of a pair is killed the mate remains by the body, fondling and caressing it and trying to tempt it by food and endearments to rise again.

It has always been very difficult to keep Polar Bears in confinement, on account of the heat and lack of swimming

facilities. The great bears at Bronx Park in New York City are probably the happiest in captivity; with a great pool to swim in, rocks to climb and a deep cave down into the cool heart of a granite rock, where they can always retire and go into cold storage. Their happiness is largely due to the ingenuity and kindness of William T. Hornaday, the director, who probably understands better what an animal wants than any man in America. But after he had provided everything that a well-regulated bear might desire, he was distressed to see his pets idle and sulking, taking no exercise and declining to utilize any of the facilities except the cold storage department. It was at this crisis that Mr. Hornaday heard from some whalers that in the arctic lands Polar Bears had been seen to play with small boulders by the hour. At once he gave his pets a small boulder and immediately all changed. They pushed, they fought and struggled, rolled the stone up hill and down hill, threw it into the pool and dived for it—and have been happy ever since. They had been like children in a fine house, but with nothing to play with.

DANE COOLIDGE.

O, beautiful world of gold!
When waving grain is ripe,
And apples beam
Through the hazy gleam,
And quails on the fence rails pipe;
With pattering nuts and winds,—why then,
How swiftly falls the white again!

—G. Cooper, "Round the Year."

BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. X.

NOVEMBER, 1901.

No. 4

AN AUTUMN EVENING.

In scattered plumes the floating clouds
Went drifting down the west,
Like barks that in their haven soon
Would moor and be at rest.
The Day sank down, a monarch tired,
Upon Night's sable breast.

The wind was all but hushed to sleep,
Yet now and then it stirred
A great tree's top, and whispering,
Awoke a slumbering bird,
Who half aroused, but only chirped
A song of just a word.

And in the west the rosy light
Spread out a thousand arms,
Each with a torch, whose crimson flame
Stretched o'er the peaceful farms,
And o'er the yellow corn, that lay
Unconscious of all harms.

Then changed into a waste of blue
A desert tract of air,
Where no rich clouds, like Indian flowers
Bore blossoms bright and fair;
And over all, a sense of want
And something lost was there.

—Walter Thornbury.

THE PINE GROSBEAK.

(*Pinicola enucleator.*)

Ere the crossbills leave the pine woods,
Ere the grosbeaks seek the ash seeds.
—Frank Bolles, "The Log-Cock.

The name grosbeak, or great beak, is a common name for a number of birds that possess large, thick and strong bills which are adapted to crushing fruits and seeds. Unfortunately this name has been indiscriminately applied to the representatives of several bird families.

The true grosbeaks are related to the goldfinch, the finches, the sparrows, the buntings and the crossbills. In fact they have some of the marked characteristics of the latter birds, as neither develop the fully adult plumage for several years.

The Pine Grosbeak must be sought in the northern regions of the northern hemisphere, where the vast forests of cone bearing trees are found, or among the coniferous trees of the high altitudes of the western mountain regions of the United States. In the latter place they are not abundant. It seems to be at home and contented only in the cold, crisp air of the far north and seldom seeks a more temperate climate except when the winters are unusually severe or there is a scarcity of food in its native haunts. It is a frequent winter visitor to the northern tier of the United States and is quite abundant, at this season, in some portions of New England. Except during the nesting season the Pine Grosbeaks are gregarious and are frequently seen in flocks of fifteen or more individuals. In the winter climate of the northern United States these flocks contain many more immature than adult birds, the younger ones seeming to be less able to withstand the severer cold of more arctic regions. Thus in this district the more brilliant plumage of the fully adult male is rarely seen, and becomes a valuable acquisition to the naturalist, for the younger birds and the females are less showy. Speaking of the beautiful male bird, some

one has said, "Scarcely can the southern climes send us a more brilliant migrant than this casual visitor from the north." There is a slight variation in the plumage coloration and in the shape of the bills of the Pine Grosbeaks of widely separated regions. These variations have led ornithologists to group these birds under geographical races giving each race a varietal name.

Speaking of the Pine Grosbeaks of Siberia Mr. Seebohm says, "Almost all the forest districts are hilly and in the north, as the trees become smaller, they are also more thinly scattered over the ground and the interminable extent of wood is broken by occasional flat, open spaces and open marshes which become gray with flowers as soon as the snow melts. The scenery is much more park-like than further south and these birds are much more plentiful and more easily seen. In the large pine forests they prefer the banks of the rivers or the outskirts of some open place and may often escape detection because of their habit of frequenting the tops of trees. Within the Arctic circle many of the trees are small and on the hilly ground they are scattered in small clumps. In places like these the Pine Grosbeaks may often be seen perched conspicuously on the top of a spruce fir, twenty or thirty feet from the ground but looking so much like the last spike of the tree as frequently to escape notice."

The Pine Grosbeak is a retiring bird and would seem to be somewhat shy as it does not frequent the roadside or inhabited places except when forced to do so by the lack of food. This, however, is not the case, for in the forests where it makes its home it is not difficult to approach it. It will frequently alight



PINE GROSBEAK.
(*Pinicola enucleator*.)
 $\frac{3}{4}$ Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

and begin feeding within a few feet of an observer.

The song of the European form of this species is said to be "exceedingly agreeable, varied, melodious, sonorous—sometimes strong, sometimes soft." It is also a mocker and to a limited extent will imitate the voices of other birds. Dr. Cones likens its song to that of the purple finch and says that during the late summer and winter it is "clear, sweet and flowing." Its call note is single, sweet and plaintive not unlike that of the well known bullfinch.

Pine seeds seem to form the principal food of the Pine Grosbeak though it also feeds extensively on those of the birch, alder and related trees. At times it will descend to the ground and gather the seeds of herbaceous plants and may eat a few insects. Dr. Dall writing of the Pine Grosbeak as he found it in Alaska, says: "I have opened the crops of a great many and always found them filled with what I for a long time supposed to be spruce buds, but on closer examination I found that they were the hearts of the poplar buds, with the scales and other external coverings carefully rejected. I have never found anything else in their crops." In those regions where the mountain ash abounds the berries of this beautiful tree form a very important part of their diet whenever it frequents such a district.

The outer wall of the home of this denizen of the forest is constructed of a framework of slender fir or pine twigs. Inside of this wall and projecting above it is placed a lining of fine roots and grass woven with a fine hairlike lichen.

The Pine Grosbeak seems to bear confinement, but when caged it is said that after the first moulting the crimson color of the plumage is replaced by a bright yellow. Mr. E. W. Nelson observed these birds in Alaska and says, "During winter, while traveling along the frozen surfaces of the water courses of the interior it is common to note a party of these birds busy among the cottonwood tops, uttering their cheerful lisping notes as they move from tree to tree. I have frequently passed a pleasant half hour on the wintry banks of the Yukon, while making a midday halt and waiting for the natives to melt the snow for our tea, listening to the chirping and fluttering of these birds as they came trooping along the edges of the snow-laden woods in small parties. They rarely paid any attention to us, but kept on their way and were, ere long, lost to sight in the midst of the bending tree tops and silence again pervaded the dim vistas of the low woods. Beyond the faint, soft call note uttered as the birds trooped along through the forests, I never heard them make any sound."

THE ANNUAL NOVEMBER CONFERENCE.

October had gone. In north central Illinois many trees had lost all their gaily colored leaves; others were fast becoming bare. With the exception of a few goldenrod and aster blooms, the splendid autumn flowers were buried in banks of dead leaves. The sun cast daily smaller shadows. Only once in a while could the tree sparrow capture a belated beetle. The quiet of the woods was broken by the busy little Mr. Squirrel gathering his winter's nuts.

The pecking of Woodpecker Brothers

& Company was busily kept up; but most of the sweet-voiced birds had gone south.

The merry voices of gay nutting parties were drowned in the rustling of dry leaves. Even Mrs. Chipmunk was startled if she heard before she saw her own Mr. Chipmunk coming toward her. The woods seemed almost lifeless.

Missing the bustling, restless life of their active summer neighbors, the birds still in the forest were beginning to feel lonesome. Some were loth to leave their

homes and familiar places. Others who were touched with a desire to join the rovers were unwilling to forsake their old friends when skies were so dark and days so dreary.

Finally they agreed to call a mass meeting to see if they could agree to all go or to all stay together.

Then arose the question of how to get word to all the birds. Although he knew that he was out of tune, cheerful yellow-breasted Mr. Meadowlark said that he would do his best at whistling through the meadows for the purpose of letting his neighbors know of the meeting. Mr. Bob White agreed that instead of always calling his own name, he would go through the fields and along the edges of the timber where he was best known, calling his comrades.

Mr. Blue Jay, Mr. Black Crow and Mr. Black-Capped Chickadee, who are always in voice, were urged to help. Mr. Crow was asked if he could not call "come" as easily as "caw." Upon making a trial he found that he could. Since he has no fear either in the fields or near the towns, he was sent to scour the country roundabout. Mr. Chickadee, who keeps a summer cottage in the thick woods, was asked to see that all the timber birds were called.

As the season was daily growing more cheerless, and as it was feared that some birds might not promptly obey the summons, the fearless, fighting Mr. Jay was told to arrest all heedless or laggard birds. As this command just suited Officer Jay, he started off in high spirits. Having no patrol wagon at his call, he took along Mr. Chickenhawk to help him manage those who must be brought by force.

Although they said that they were anxious to have all the birds present, the Woodpecker Brothers and their partner, Mr. Nuthatch, said that they could not drop their work to roam over the state, but that they would help by pecking and pounding as noisily as they could so that the gathering birds might know in just which timber to alight.

At last the day for the meeting came. The sky was sunny, but the air was chill. It was about the middle of November and the days were growing shorter and

shorter. You would be surprised to know how many different birds were present.

The great strong Mr. Bald Eagle was chosen to conduct the meeting. This he did in good style. He told the object of the meeting in a little speech: "Neighbors, friends and relations," he said, "we have come together to discuss a very important matter. Spring came with all its beauties, fresh promises of life and new chances. Warmed with renewed vigor, we began our year's work with great vim. You all know how hard every one of us has worked in building a home and rearing a family. Summer, with its plenty, has passed and our children are grown. Shall we join those of our old neighbors who have already left for other homes in the sunny southland? Or, shall we face the winter's storm and cold here? Let us hear from every one present. Which shall we do?"

As everyone waited for someone else to speak first, it was as quiet as Quaker meeting. After waiting a while, as jolly Mr. Robin is so well known and liked, Chairman Eagle called upon him. Robin replied: "My summer in Illinois has been a pleasant one. Here are many fond ties. Wife and I have had a cosy home in which we have raised four of our five children. They are now happily flying about. We have but one sorrow. A cruel stone from a sling-shot killed our other baby." Here Mrs. Robin cried so that he could not go on until he had pulled out his handkerchief and wiped his eyes. Her cousins, Mrs. Thrush and Mrs. Bluebird, tried to quiet Mrs. Robin by fanning her and holding some smelling salts to her nose. Choking back a lump in his throat, Mr. Robin went on talking. "We have found strawberries, mulberries, cherries and other fruits in plenty, and have never lacked for insects that are our reliance for food. But winter with ice and snow is coming. Jack Frost has already been here and has driven away most of our bugs and worms. Our bills are not strong enough to crack nuts. Wild berries which we can eat are almost gone. Unless the kind children scatter us plenty of crumbs, if it freezes so hard that we can get no more insects, sorry as we are to leave, we must go to a warmer country. But

we will go no farther than we must, and will return as soon as we can. We remember that last year in December there was a spell warm enough for bugs to creep out and we came back for a five days' visit. We prefer to remain if we can get a living."

This started them all to talking, and they had to be called to order. Singer Bluebird said that he, like the Robins, cannot do without his bugs and worms, and must go where he can get them or starve.

Mr. Quail, who likes to be called Bob White, said: "My dear plain little wife and my children very much prefer bugs. We are all so fond of them that we relish even potato beetles. Yet, in winter time—unless they are covered by a deep snow, we can find grains, weed seed and other things which will keep us from starving. In that case, we can go to the poultry yard and eat with the chickens. We fear freezing most. After all the good work which we do for the farmer, he might well afford to provide us a shelter. But it is to be supposed that he does not think of it. However, we will risk staying here."

Two chums, Mr. Crow Blackbird and Mr. Red-Winged Blackbird, who had been driven from a marshy place by Blue Jay, sat side by side on the same limb and were having fine sport making faces and winking at each other while the speeches were being made. Both can help the farmer. Mr. C. Blackbird can eat mice and the scattered corn kernels. Mr. R. W. Blackbird can pick smartweed, ragweed and other weed seeds. Yet both declared that they could not get along without insects and they did not mean to try. "Down south," said Mr. R. W., "if insects are scarce, there are plump rice kernels which taste better than old weed seed."

Up spoke Mr. Common Crow: "I would not be so particular. I teach my children to eat corn, and mice and we can find both around the corn-crib. And we can always find a frozen apple in the orchard, or some potatoes or turnips in the garden, or a forgotten pumpkin in the field. These taste very good. If we are very hungry, we can pick up dead rabbits and birds. We will stay so as to be here when the farmer

begins his spring work. We are not afraid of his scarecrows. They never hurt us. We help the farmer so much that he will surely let us get a living around the farm. He will never miss what we eat."

A pair of Turtle Doves on a limb of a neighboring tree softly sang, "Coo, coo, we will stay, too."

There were several of the Woodpeckers present. The little black-and-white one with red patches on the sides of his neck, who is called Downy Woodpecker, tried to speak for the whole family. We all must have our insects. God has given us long, strong bills so that we can peck holes into the wood in which bugs and grubs are hidden. Sometimes merely our tapping charms them so that they crawl out for us. If they do not, we can run out our long tongues and catch those beyond the reach of our bills."

His big red-headed brother went on: "Oh, yes! we can find enough to eat. I can leave the trees for hunting places for the rest of the family. There is plenty of food good enough for me in fence posts and telegraph poles. Besides, I can eat cedar berries, nuts and other things. No need for me to go off on a tramp in search of food. Ha, ha!" chuckled he, "I have already begun to lay aside for winter. You'll not catch me starving here. I know just where to find knot holes, cracks in railroad ties, loose pieces of bark and loose shingles on houses which hold a good supply of beech nuts and acorns. If I find an apple on the tree, I can bore into it for the seeds. Then there are choice bits to be found around the cow sheds and barns. We have no thought of going away."

The pair of Turtle Doves nestled closer together and again sang, "Coo, coo—we will stay, too." Everybody smiled at their loving peace of mind.

"I have already begun to hollow out a hole in a high tree for my winter home," said Downy Woodpecker.

"So have I," said the pretty Golden Winged Woodpecker, who is nicknamed High Hole; "and it is in a place that just suits me in the tip top of a very tall tree."

Mr. Nut Hatch rose to his feet. "I

too hammer into cracks and holes such things as sunflower seeds, corn and nuts for winter use. Mr. Chickadee and I have agreed to work together. I hunt only on the trunks and larger limbs, leaving the smaller branches for friend Chickadee. If he can not find quite enough he knows how to hunt around houses. Children who see him only when snow is on the ground call him Snowbird and sometimes kindly throw him crumbs."

"I can eat buds of some trees and seeds, too," added Mr. Chickadee.

Just then a Northern Shrike alighted in their midst. In an instant there was a flutter of great alarm. The cool headed chairman bade everybody to sit still and he would see to it that nobody was hurt. Because of his cruelty, you know, the Shrike is often called Mr. Butcher Bird. He catches other birds which he hangs on great thorns while he tears and eats their flesh. Even the English Sparrows are afraid of him.

Chairman Eagle explained the purpose of their meeting and Mr. Shrike promised to hurt no one. Looking around he said, "I have just come from my summer home in the north to spend the winter with you. I see gay little Winter Wren hopping around. As soon as there comes a northern snowfall heavy enough to cover the weed seeds there Mr. and Mrs. Snow Bunting will join us."

"How glad we will be to see them; glad to see them!" chattered happy Chickadee. "We will have a jolly game of snowball. Chick-a-dee-dee-dee! Da-da-day!" And he hopped along and around a branch one of the most light-hearted creatures living.

Mr. English Sparrow wished to say something. "Our flock can always find a warm place and something—"

Just then a hoarse voice was heard calling, "Who, who, who, who, ar-r-r-re you?" As the feathered people must ever be on the alert to protect their lives, in a second all was as quiet as the grave. Thinking that some better dressed bird only meant to make fun of him and his many wives Mr. English Sparrow flew into a passion and began to pull off his coat.

Mr. Eagle told the crowd that there was no need of a scare. "That," said he, "is only Mr. Barred Owl in yon tree. He has been roused by our talking. Put on your coat, foolish Mr. Sparrow."

Mr. Jay could not let slip the chance to twit his neighbor. "Ha, ha!" said he; "you had better get enough more wives to teach you how to behave yourself."

Everyone looked around laughing. Thinking that night had come and that his friends from the next timber had come to make a call, Mr. Owl again broke out: "He-he-he-he, hi-hi-hi-hi, ha-ha-ha-ha!"

Mr. English Sparrow was vexed and ashamed, but being afraid to get into a fight he flew off.

As it was getting late in the day the chairman said that the meeting must close. "It is useless to talk longer," said he. "It is plain that our pretty Meadow Larks and other insect eating birds must move or starve. We shall be very sorry to see them leave and hope to meet them again on their return next spring. They are needed at the south. May God speed their journey.

"But some of us must remain or shirk our duty. The Turkey Buzzards and their helpers must be here to clean up the fields and groves and to clear away dead things washed ashore. If these things are not done the foul air next spring may make much sickness. Woodpeckers must keep at their work or plants will suffer next summer. Those who can eat seeds must be active or the farmers will not be able to keep down the weeds. Grouse, Jay, Wax Wing and others who can manage berries and nuts must not leave or in a few years trees and underbrush will be so thick that there will not be room for them to branch out. Even our hated Mr. English Sparrow is needed to pick up droppings in the street and waste around houses. We are all needed—each to do his own bit of work in his own place and way. Although that may not be just what we prefer, may we all do our duty just as cheerfully as man's friend, Mr. Turkey Buzzard, does his unpleasant tasks."

LOVEDAY ALMIRA NELSON.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



FIELD SPARROW.
(*Spizella pusilla*.)

Copyright 1907 by A. W. Humphrey, Chicago.

THE FIELD SPARROW.

(*Spizella pusilla.*)

A bubble of music floats
The slope of the hillside over;
A little wandering sparrow's notes;
And the bloom of yarrow and clover,
And the smell of sweet-fern and the bayberry
leaf,
On his ripple of song are stealing;
For he is a chartered thief,
The wealth of the fields revealing.
—Lucy Larcom, "The Field Sparrow."

The Field Sparrow is the smallest of our sparrows and is quite easily distinguished from the other species by its reddish bill. The common name is misleading, and perhaps it would be more appropriate to call this bird the Bush Sparrow, a name by which it is frequently known. Instead of the field it seems to prefer the pasture, with its weeds and bushes. It will also frequent the shrubby thickets that follow the removal of a forest. This shy bird has a somewhat extensive range, which includes the eastern United States and Southern Canada. It passes the winter months chiefly in those states south of the Ohio river.

The Field Sparrow when frightened does not retreat to the cover of foliage, as does the Song Sparrow, but flies to an exposed position on top of bush or low tree, where it can watch and await developments. In the fall they frequently gather in small flocks. If disturbed all will fly to the nearest bushes, and in perching will cluster close together.

The Field Sparrow is all the more interesting because of its shyness. Mr. Keyser speaks of it as "a captivating little bird, graceful of form and sweet of voice, singing his cheerful trills from early spring until far past midsummer. The song makes me think of a silver thread running through a woof of golden sunshine, carried forward by a swinging shuttle of pearl." Mr. Chapman says: "There is something winning in his appearance; he seems such a gentle, inno-

cent, dove-like little bird. His song is in keeping with his character, being an unusually clear, plaintive whistle, sweeter to the lover of birds' songs than the voice of the most gifted songstress." It is not possible to describe the song in words, for it varies greatly. No two birds seem to have the same song and the same bird may vary its song. Locality also seems to affect its character. It is the sweetest at the going down of the sun and in the early twilight. To hear it then, in the absence of all other sounds, is indeed soul inspiring.

Its delicate nest, too, becomes the lovely character of this little bird. This small house is usually placed near the ground in a low shrub, or on the ground where it is well protected by tall grasses. The nests are not usually found near fence rows, but rather in less public places, on hillsides and nearer the center of the field. When possible, a thorny bush is chosen. The nest is constructed of fine grasses and very fine roots loosely woven together and lined with finer grasses, hair and the delicate bark fibers.

Writing of the finding of a Field Sparrow's nest near the top of a hill, some one has said: "How 'beautiful for situation' is this tiny cottage on the hill! Here the feathered poets may sit on their leafy verandas, look down into the green valleys and compose verses on the pastoral attractions of Nature. One is almost tempted to spin a romance about the happy couple."

DISHRAG VINES.

Margie was cross. It was a rainy day, and she was having to sew; two things she hated.

"I think it might rain on school days. And I wish dish-cloths had never been invented," she exclaimed, jerking her thread into a tangle.

"You ought to move down south," quietly said her aunt.

"Why? Don't they have rain and dish-cloths there?"

"Yes, of course they do; and I will tell you a true story, if you will promise not to complain the least bit for the rest of the day."

Margie promised; and, after threading a needle, her aunt began:

"When I was in Georgia, last October, I saw a queer vine growing over the porch of an old negro's cabin. It looked like a pumpkin vine, with its great coarse leaves, and it had green, gourd-like seed pods, or fruit, hanging all over it. I asked the old colored man, who was hoeing near by, about it, and he said, in surprise: 'Lawsy

me! Didn' you neber heerd tell ob a dish-rag vine afore?"

"Dishrag!" I echoed.

"Yes, they grows dishrags on 'em," he answered. Then, pulling off one of the funny gourds, he cut it in two and showed me the matted fibers inside. It seems when these halves are dried in the sun, that they become something like a tough sponge.

"He seemed very proud of the fact that his wife had used one for a whole year, and asked, in a tone half of pity and half of disgust, 'Does you all hab ter use er rag?' He was pitying me just as I was sorry for him! It was too funny to see him hobble off, shaking his head and laughing at a white woman who 'neber knowed nothin' 'bout dishrag vines!'"

"Will you bring me one next winter, aunt?" Margie asked.

"Do you want to wash my dishes with it?"

"N-no. I'd rather hem cloths, I b'lieve; but I'd like to try it on my doll dishes."

LEE McCRAE.

A SNOW-FLAKE.

Once he sang of summer,
Nothing but the summer;
Now he sings of winter,
Of winter bleak and drear:
Just because there's fallen
A snow-flake on his forehead,
He must go and fancy
'Tis winter all the year!

—Thomas Bailey Aldrich.

NEIGHBORING WITH NATURE.

We were at breakfast one morning, when a loitering breeze from the woods filled the room with delicious aroma. The graceful spring flowers and the wild fruit trees were just beginning a life of promise.

"There's sweet smelling fern in that," exclaimed Charley, sniffing critically.

"I think it's from the crab-apple trees by the chalybeate spring," said grandma.

"No, it's the chicksaw plums by the creek," cried Margaret.

"It 'mells 'ike 'bacco moss to me," murmured Pearl, touching the tip of her nose with her dainty forefinger.

"I know what it is," asserted Grace; "it's the wild cherry tree; it's full of blossoms."

"There's Ginseng in it somewhere," laughingly commented papa.

"Ginseng?" cried the children. "What's that?"

"The name of a plant in the wood. The word is supposed to be of Chinese origin. The Iroquois called the root garentoqucu, literally, legs and thighs separated. The plant belongs to the genus *Panax*, and it is a great medicine with the Chinese. We export it in large quantities, but northern Asia grows it as well as we."

"And there is some in our wood?"

"Yes, I saw some yesterday near the tobacco-plant bed."

"Can we go for some as soon as we have finished breakfast?"

"Yes, and I will go with you. A walk through the wood will be good for us; I feel like I had slept a hundred years and been one of Tennyson's characters in *The Day Dream*."

"And I," said the artist, "will take my pencil and sketching block."

Six plants were found, all having good long roots.

"What you have now would cost you a quarter of a dollar if you were buying it," said papa.

"One could live very well then, by gathering Ginseng to sell," commented practical Charley.

"Why, yes, you remember old Uncle Baskett, the colored doctor?"

"Yes," said Margaret. "He cured toothache by hanging a rabbit's foot about your neck."

"And fits with a four-leafed clover," cried Gracie.

"He made his living," went on papa, "after he was freed, by collecting the roots of Ginseng, *Calamus* and other medicinal plants, and it was then, too, he gained his almost marvelous knowledge of herbs, becoming famous, even among the white people, for his success in curing certain diseases."

"I think this leaf and root are accurate," said the artist presenting the sketch.

"To a 'T,'" cried the children. "You must go with us every walk we take."

Sallie Margaret O'Malley..

Gaunt shadows stretch along the hill;
Cold clouds drift slowly west;
Soft flocks of vagrant snow flakes fill
The redwing's empty nest.

—Thomas Bailey Aldrich, "Landscape."

THE CAROLINA WREN.

(*Thryothorus ludovicianus*.)

This little brown bird is sufficiently hardy to remain throughout the year a resident of the localities which it frequents. This is true except in the northern part of its range, which covers the eastern United States as far north as the states of Wisconsin and Connecticut.

The Carolina Wren does not enjoy the society of men and unlike its relative, the house wren, does not seek "the cozy nooks and corners about the house of man," but rather the distant shrubbery and the forest. Here it hides and is more often heard than seen. In spite of this show of timidity it is not so shy and retiring as it would seem. It loves the privacy and seclusion of the forest yet it will frequently visit the garden and explore outhouses. "If we attempt to penetrate its hidden resorts it hurries away into deeper recesses with a low fluttering near the ground, or scrambling and hopping from one bush to another, very likely mocking us with its rollicking song as soon as it feels perfectly secure.

It is restless and curious like the other wrens. Perhaps it is even more inquisitive than its sister species, for it is certainly more active. Frightened from a favorite perch the Carolina Wren will return and, from a safe cover of foliage, slyly examine the cause that disturbed it, "peering from among the leaves with an inquisitive air, all the while teetering its body and performing odd nervous antics as if it were possessed with the very spirit of unrest." When disturbed it seems to challenge the intruder with a chattering note that has a harsh and decidedly querulous tone.

It seems almost incredible that such a delicate and sprightly being should exhibit so much temper and resentment. Intrusion of its chosen territory by its own kind is resented even more vehemently.

The Carolina Wren possesses a wonderful vocabulary with appropriate notes for all occasions. It is highly musical. Its song is rich and sweet, voluble and melodious, loud and clear and seemingly as happily delivered in one season as in another. Mr. Chapman says: "He is sometimes called Mocking Wren, but the hundreds of birds I have heard were all too original to borrow from others. In addition to his peculiar calls he possesses a variety of loud, ringing whistles somewhat similar in tone to those of the tufted titmouse or cardinal and fully as loud, if not louder, than the notes of the latter."

It is difficult to state its preference in regard to its choice of nesting sites, for it will select any place that suits its fancy. The hollow of a tree or a stump, a thickly branching shrub or a secluded nook in some unfrequented outhouse, perhaps with a knothole for a doorway—all these places are equally suitable and some one of them will meet the taste of this positive little bird.

The materials used in the construction of the bulky nests are any fibrous substance, sticks, leaves, fine grasses and "in fact trash of any kind." The lining of the ball-like nest, which has a side entrance, is made of finer fibers, hair and grasses. In this cozy home are laid from four to six creamy white eggs which are "variously marked with reddish brown and lilac, in a wreath or cluster at the larger end."



CAROLINA WREN.
(*Thryothorus ludovicianus*.)
About Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

THANKSGIVING BY THE NINNESCAH.

It was Thanksgiving Day in Kansas. The sun still shone warm over the yellow cornfields and the brown prairies, tho' there was a hint of frost in the air, and the nearly bare trees stood as ominous tokens of the coming winter. The autumn wind blew a perfect gale from the southwest. Down in the valley by the river the sand was flying in stinging clouds, jerking the few remaining yellow leaves from the cottonwoods, ruffling the waters of the Ninnescah, beating the purple veil from the hedges where the autumn sun had tangled it, bending the long reeds, and drifting in little mounds beneath the wild-plum bushes.

On the uplands where the curly buffalo-grass spread its thick brown carpet, the whitened heads of the golden-rods bent before the wind, the sage-grass waved its long yellow stalks, and the sunflowers rattled their bare stems and brown heads together.

Behind the shelter of one of the sand-hills beside the Ninnescah river a strange assembly of birds and beasts and creeping things had gathered.

A couple of rough-coated, sharp-eared gray coyotes were rolling and tumbling over one another in a good-natured scuffle.

A bunch of quails were picking up the seeds which the wind shook from the sunflower pods above them, while a few brown prairie chickens lay sunning themselves upon the sand.

A long-eared jackrabbit sat erect upon his haunches in solemn dignity, acting as umpire to the coyotes' prize-fight; while his cousin, the little cotton-tail rabbit, nibbled at some tender twigs that grew near by.

A rattlesnake was curled up in the sunniest place to be found, and his companions, the cunning brown prairie dog and the little grey owl, sat near by.

Sand lizards flashed here and there beneath the plum bushes, and the guest of honor—a huge mountain lion—lay dozing within the shelter of the thicket.

Blue jays, blackbirds, brown thrushes, scarlet-coated redbirds, sparrows and yellowhammers flitted from bush to tree: meadow larks trilled their cheerful song; while up on the topmost twig of a tall cottonwood tree a mockingbird swung in the wind and poured his whole soul through his little throat in a wonderful stream of melody.

All the delegates of the animal world being at last assembled, the jackrabbit—in consideration of his dignity—was made master of ceremonies, and called the assembly to order in the following words:

"My honorable friends, the birds and beasts and reptiles of Kansas: We have assembled here today to hold a sort of Thanksgiving service.

"Once every year men gather themselves together to count over the good things that have come to them, and to congratulate one another over the evils they have missed.

"It may occur to some of you that we birds and beasts have little for which to be thankful in these days when dogs and men are so numerous, and when life is attended with so many privations and dangers. But, upon careful thought, I think each one present will be able to add an item to our list of blessings of the past year that will encourage us through the winter days so near at hand.

"Our friend and guest, the mountain lion, will please to address us."

The mountain lion opened his fierce eyes, stretched his huge paws, rose slowly to his feet, and shook the sand from his rough coat.

In spite of the truce of the occasion, the smaller animals eyed him with evident terror, and the prairie chickens fluttered their wings as if ready to fly away from so dangerous a neighbor.

"What have I to be thankful for?" the lion asked in harsh tones. "I am thankful that I have come through the year with a whole hide in spite of dogs and guns and men. I am thankful that dogs are afraid of me, and that men dare not

attack me single-handed. I am thankful that after all my wanderings from the solitudes of the Indian Territory mountains, I have found this comparatively safe retreat among these sandhills and plum thickets. Calves, and pigs, and chickens—and rabbits—have been abundant; so I have no cause to complain of poor living. Kansas would be paradise if it contained neither dogs nor men.” He ground out the last sentence with a growl which would have caused both dogs and men to tremble if they had heard it, then lay down and resumed his nap beneath the bushes.

A respectful silence had fallen over the assembly; for “Who shall follow the king?”

As soon as the jackrabbit had gotten over that terrible reference to rabbits enough to steady his voice, he called upon the coyotes for remarks. Both sprang briskly to their feet, and as neither one would give way to the other, they addressed the assembly in alternate barks:

“I am thankful that I am so swift a runner that no dog can catch me.”

“And I am thankful because I can scare almost any dog that tries to catch me. How they do run and howl when I turn on them!”

“Chickens and ducks and geese are plentiful; and though the chickens learn to fear us and roost high, ducks and geese are always on the ground and can neither fly nor run.”

“This has been a fine season for young pigs, and I also caught several lambs that made tender eating.”

“There are such delightful thickets along the rivers and streams, that coyotes have plenty of safe hiding places. I have made good burrows beside the Ninnescah and Arkansas rivers, the Cowskin and Honey creeks, and I go back and forth at pleasure. Yes, Kansas is a pretty good country for coyotes—barring the dogs and men.”

“Yes, barring the dogs and men.”

Both coyotes sat down and the little cotton-tail spoke:

“Life is hard and dangerous for a rabbit at best. There are so many enemies to fear, and even our swift flight often fails to save us. I have fared well this year. I found a place where the farmer keeps no dogs and owns no gun. To be sure,

he had woven-wire fences around his garden and his young orchard, but I found a cunning little hole in the fence behind one of the grapevines that was just made for a door for a poor little rabbit, and I tell you I have lived high. Such peas and lettuce and cabbage as that man did have! Enough for twenty rabbits like me. Then for a change I nibbled the tender shoots on the grapevines, and now am expecting to get my living this winter by gnawing the bark from several hundred young fruit trees which he has set out. I have already found a hole under the fence. So I have cause to be thankful to-day.”

The little prairie dog sat up stiffly and tried to look dignified as he addressed the assembly.

“Life has been full of ups and downs for me and for my friends, the rattlesnakes and owls. We had made a fine burrow in a broad pasture, and all last year we lived there in peace. This year the man who owned it concluded to plow it up for a cornfield; and the first thing he did, he turned the water from a slough right into our beautiful prairie dog town and flooded all our carefully dug homes. Many of my brothers and cousins were drowned or rushed out of their holes only to be slain by the dreadful dogs and men.

“I was more fortunate, because I had run one of my tunnels in an uphill direction for fear that water might some time trouble us. When the flood came I retreated to this high point and saved myself, altho the water almost reached me, and I was obliged to stay there for several days before I could make my way out.

“Now I have a pleasant home here among the sandhills, and I have been careful to dig a good upper story with an opening through which I can escape in time of need. The rattlesnake and the owl share my humble home, and we live in peace together.”

The owl nodded his wise head, and the snake shook his rattles in approval of this address which included themselves, and made it unnecessary for them to add their voices to the speechmaking.

A little green lizard roused himself from his warm place in the sun and added his squeaky voice to the general conference:

“I know nothing about dogs and men. My brothers and I live here upon the

sandhills where insects are plenty and enemies are few. We spend hours in basking in the delightfully hot sun, and if any noise alarms us dart to our hiding places beneath the roots of the bushes or under some rotten log or tree. We are of several colors, gray, green, yellow or brown, and when we lie still upon the sand or on logs or under leaves it is hard for any beast or bird or man to see us. We may have few blessings, as the world goes, but we at least have nothing of which to complain."

The prairie chickens were next called upon for an account of themselves, and answered:

"We are the sole representatives of the great coveys of birds of our kind that used to make their homes upon these prairies. Their drumming could be heard within the thickets, and the swift whirling of their brown wings as they beat the air in their diagonal flight. Life was a pleasure to prairie chickens in those good old days before we were born.

"Now it is different. Men learned to consider our flesh a delicacy and hunted us down. They even grudged us the grain that we gathered from their broad wheat and corn fields and treated us as common robbers. Now only a few of us are left, and we dare not call our lives our own. We have learned to be very shy and to hide in the most solitary places. Still, life is not all trouble. The winters in Kansas are short and usually mild, there are plenty of good warm thickets and hedges, and there is always plenty for birds to eat, unless the snow is uncommonly heavy. So we manage to be happy and take each day as it comes."

The quails trooped forward as the prairie-chickens ceased speaking.

"We are the farmer's friends," said they, "and therefore the farmer is friendly to us. We eat the bugs and worms that would destroy his crop. We take a little of his grain now and then, but we more than repay the damage by our warfare upon the bugs.

"We have been so fortunate as to find a farmer who appreciates us, and will allow no one to shoot us. So our year has been peaceful, and we have been bountifully fed."

An ungainly toad hopped forward as the quails ceased speaking:

"I do not look much like a quail, and can neither fly nor run nor sing; but I also am the farmer's friend, and am always ready to seize my opportunities when they come in the shape of flies and bugs. I may not be beautiful, to some unappreciative eyes, but I am at least useful."

The birds having selected the chattering jay to speak for them, he raised his voice as follows:

"My friends desire me to say that our lives are lived above most of the things that annoy the rest of you. Floods and dogs and fences do not trouble us: still, we have dangers enough of our own. There are snakes that climb to our nests and destroy our young. There are prowling cats, and pouncing hawks, and boys with bean-shooters, and men with guns, all of whom are lying in wait for our lives. We are so common and so numerous that men fail to appreciate what we do for them. We make their groves bright by our brilliant plumage, and gay with our cheerful songs. We eat millions of caterpillars and bugs and worms. To be sure, we eat some of the grain and peck the ripest fruit, but then that should be looked upon as our just reward for our labors in men's behalf. Some of us will soon be taking our flight to southern climes, but many of us will remain here in the friendly shelter of the thickets until spring comes again."

What more the blue jay might have said was cut short by a great crackling of the bushes, which startled all the birds and smaller animals, and caused even the mountain lion to raise his head and sniff suspiciously.

Their alarm was quieted by the appearance of an old white horse who looked around upon the assembly and asked:

"What is all this? How does it come that coyotes and rabbits, birds and lizards and insects and lions"—very respectfully—"are associating in peace together?"

The object of the meeting was explained to him, and he was asked to add his word to the Thanksgiving service.

"What have I to be thankful for? Look at my bones almost sticking through my skin, my knees strained and my eyes almost blinded by pulling too

heavy loads, my wind broken by hard driving, my skin scarred by cruel blows. Life has been all hard work, with scanty food and little rest. What have I to be thankful for? I do not know, unless it is that my cruel master died last night, and can never beat and curse and starve me any more. This is scanty pasture here among the sandhills, but it is better than a full manger, and curses and abuse therewith. Often the best thing that can happen to a horse is to have his master die. And so I am duly thankful."

As all had now been represented, the jackrabbit said:

"My friends, the reports have now all been made. We have heard many pleasant things, and many things which make us sad. I think, however, that each one has found some cause for thanksgiving, even though his life is hard and filled

with danger. All of us have learned that there are troubles and difficulties in the lives of others, many of which do not afflict us, and for this we should be duly thankful. From lions to lizards is a long step in the animal world, but there is a chain of common experience all the way through, binding us together.

"Let us remember through all the year to come, that there is no life without trial and privation, without hope and blessing, without cause for thanksgiving. Let us sympathize more with one another, think less of our own trials, and look oftener at the bright spots that come into our lives.

"The Thanksgiving Assembly for the year Nineteen Hundred and One is now adjourned."

MARY MCCRAE CULTER.

Wildly round our woodland quarters,
Sad-voiced Autumn grieves;
Thickly down these swelling waters
Float his fallen leaves.
Through the tall and naked timber,
Column-like and old,
Gleam the sunsets of November,
From their skies of gold.

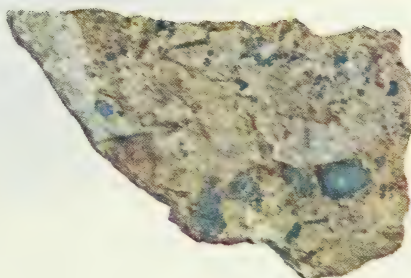
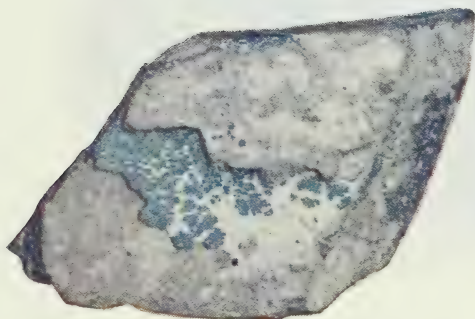
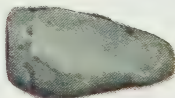
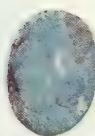
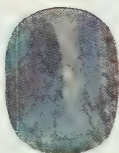
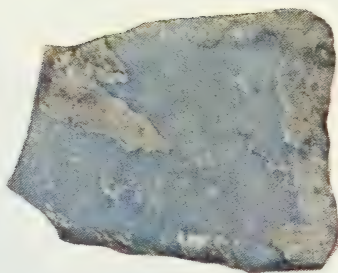
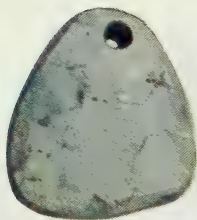
O'er us, to the southland heading,
Screams the gray wild-goose;
On the night-frost sounds the treading
Of the brindled moose.
Noiseless creeping, while we're sleeping,
Frost his task-work plies;
Soon, his icy bridges heaping,
Shall our log-piles rise.

—John Greenleaf Whittier, "The Lumberman."

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



BLACK-POLL WARBLER.
(*Dendroica striata*.)
Life-size.



SPECIMENS LOANED BY FOOTE MINERAL CO.

445

Indian Amulet.
Artificially polished.
Natural.

TURQUOIS.
(New Mexico.)

Waterworn.
Waterworn.

Artificially polished.
Artificially polished.
Natural.

COPYRIGHT 1901, BY A. W. MUMFORD, CHICAGO

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

THE BLACK-POLL WARBLER.

(*Dendroica striata*.)

Warbler, why speed thy southern flight? Ah, why,
Thou, too, whose song first told us of the spring,
Whither away?

—Edmund Clarence Stedman.

Few birds have a wider and more extended range than the Black-poll Warbler. Wintering in the southern United States, Central America and the northern part of South America, they move northward in the spring, reaching Greenland and Alaska in June. Their range extends to the westward as far as the Rocky Mountains. Their breeding range is nearly confined to the regions north of the United States.

This little bird which travels so extensively is a little later than many of the warblers in arriving at its summer home, but it seems to waste little time on the journey, as it flies rapidly and stops but little to search for food. These words of the poet,

"And warblers, full of life and song—

All moving swiftly on their way,"
truthfully illustrate the flight of the Black-poll in its spring migration.

This species exhibits habits similar to those of the flycatchers and "may be considered as occupying an intermediate station between the flycatchers and warblers, having the manner of the former and the bill partially of the latter." There is no better illustration of the saying that "The nice gradations by which nature passes from one species to another, even in this department of the great chain of beings, will forever baffle all the artificial rules and systems of man."

The Black-polls are at home not only in the woods but also in the tops of the tallest trees. They prefer those forests that border on water courses or swamps where, flying from branch to branch they quickly catch the winged insects with a

snap of their bills not unlike that of the flycatchers. Like the flycatchers, too, the color of their plumage is beautifully adapted to obscuring them in their dark green foliage retreats.

Standing on the very tip of some evergreen tree, "the chaste little figure striped in half mourning and capped in jet-black," will burst out in a happy song and then quickly fly into the dark recesses of the forest.

The female shows a strong attachment for her nest and exhibits great anxiety on the approach of any being, "beating her wings along the branches in the utmost distress, or one may still hear her sharp clipping note of alarm as she disappears in the almost impenetrable growth of small black spruce."

The nest is interesting. It is usually placed on a large branch at its junction with the trunk of the tree. A cone-bearing tree is selected and the spruce is preferred, as in it the nest is more perfectly obscured. The Black-poll's house is not the delicate structure that one would expect to find as the home of so dainty a bird. This bulky structure is usually placed not higher than six or eight feet from the ground. It is constructed from the fine twigs and sprays of the evergreen trees and fine roots woven with weeds, moss, lichens and vegetable and animal hairs. The lining consists of fine grass and feathers. Though the external diameter of the nest is fully five inches, the internal diameter seldom measures over two inches.

Mr. Langille has beautifully described the song of the Black-poll. He says,

"That song, though one of the most slender and wiry in all our forests, is as distinguishable as the hum of the cicada or the shrilling of the katydid. Tree-tree-tree-tree-tree-tree-tree, rapidly uttered, the monotonous notes of equal length, beginning very softly, gradually increasing to the middle of the strain

and then as gradually diminishing, thus forming a fine musical swell—may convey a fair idea of the song. There is a peculiar soft and tinkling sweetness in this melody, suggestive of the quiet mysteries of the forest and sedative as an anodyne to the nerves."

TRAGEDY OF THE AIR.

Sweet voices midst the blossoms;
Amidst the meadow-blooms;
Midst mallow-buds and sedges;
Midst flower-hearts by their looms;
Through vistas of the forests,
Round minaret and dome,
The mists of mountain torrents;
Through rainbows of the foam;
Above the rush of waters;
Above the swirl of seas;
Through labyrinths of maremma—
Ah yes, and more than these—
Yet flashes out a remnant
Of bird-wings on the air,
Or floats the song-birds' rhythms
Midst slaughter and despair.
Is there no human pity?
In all the world so wide
Can nothing stay the slaughter,
Can nothing stem the tide
Before, from Nature's pageant,
All bird-life joy is crushed;
Before the wings lie broken
Before the songs are hushed?

—George Klinge.

OFF FOR THE SOUTHLAND.

The first frosts of autumn are a warning to the summer songsters that it is time to prepare for their long trip to the southland. From pine and beech and shrub they come, lingering to catch a stray insect or to feast on the seeds so plentiful at this season of the year, steadily collecting until dozens and fifties and hundreds of a kind are grouped together.

Whether the smaller birds, such as the robins, blue birds and ground birds, select a leader for the trip south, it is difficult to say. Some birds do so, and follow their leaders, as the sheep of olden time followed their shepherd. However this may be, these fine-feathered travelers are careful to remain in a squad as compact as possible, and a note of alarm from one puts the whole legion to flight.

All birds of short flight travel by night only, perhaps because it is a time less beset with dangers from the enemy; perhaps instinct is more in control at night, when there is naught but dreams of the southland to claim their attention. Some authorities have surmised that the birds, like the mariner, are familiar with the heavens and, taking some star or constellation as their guide, fly straight to the summerland of the world. But this last is not a safe conclusion, for the blue birds and robins have been known to err in their choice of a wintering place, some stopping in northern Georgia and perishing there because of their blunder. Others have remained in the Middle States throughout the winter, which grave error the best students of bird-nature have been unable to explain.

But we must not infer from this that birds, as a rule, travel at random and trust to what man calls "luck." These little perching birds are the ones most

liable to mistakes, and a sudden change in the weather or an unusually tempting food supply may lure them to pause too long in these more northern regions, delaying them until it is impossible for them to finish their trip. They have a very short flight, compared to other birds, and it is no slight task for them to accomplish a journey of a thousand miles or more. Yet they go and come with remarkable precision, and there are many instances of a pair nesting in the same tree or crevice or broken limb for several years in succession. When spring returns, some happy experience of the year before brings them back to the loved spot, and there they linger till time for the fall migration.

The birds which are most unerring in their time and course of flight are the water birds. The wild geese are first in this particular, flying high in the air and with the leader ever in full view of the flock, remaining on the wing for from twenty-four to forty-eight hours. To be classed next to these are the herons, the wild ducks and the bittern, the long-legged waders, and the little sand-pipers. All these follow the water courses, the Mississippi and its tributaries being their principal highways.

The ground birds usually follow the prairie countries, though the clearing away of forests has induced them to frequent eastern Indiana and Ohio in recent years. But the western prairie states are their acknowledged summer homes, from whence they gather in companies when autumn comes and, like their fellows, flee to a warmer clime till their favorite dunes and marshes are again habitable.

CLAUDIA MAY FERRIN.

TURQUOIS.

This mineral differs from nearly all others held in favor as gems, in not being transparent and never occurring in the form of well defined crystals. The opal is perhaps the only other gem of which the same may be said. In composition Turquoise is a hydrous phosphate of aluminum, the percentages being: Of water, 20.6 per centum; of alumina, 46.8 per centum, and of phosphoric oxide, 32.6 per centum. Thus in composition as well as opacity Turquoise differs from most other gems, they being usually silicates or some form of silica. Besides the above ingredients Turquoise always contains a small percentage of copper oxide and usually iron, calcium and manganese oxides in small amount. It is the copper compound which undoubtedly gives Turquoise its inimitable color, that color to which it owes its chief charm as a gem. The color varies from sky-blue through bluish-green and apple-green to greenish-gray.

Of these colors the pure sky-blue or robin's-egg blue is by far the most highly prized and is in fact the only standard color for the gem. Green is, however, the most common and the most lasting color of the mineral, and it is one of the faults of the gem that the blue shades often fade to green after being exposed to the light for a time. In a stone of first quality, however, especially a Persian Turquoise, such fading of color is exceptional. A good Turquoise also maintains its color in artificial light. The hardness of Turquoise is 6, in the scale of which quartz is 7. It is therefore somewhat more easily scratched than other gems. Its specific gravity varies from 2.6 to 2.8, being about that of quartz. It does not fuse before the blowpipe, but turns brown and assumes a glossy appearance. By the copper of the Turquoise the blowpipe flame is usually colored green. When heated in a closed glass tube the mineral

turns brown or black and gives off water. Almost any of these tests will serve to distinguish true Turquoise from stones used to imitate it. It has a conchoidal fracture and waxy lustre. On account of its opacity it is almost never cut with facets like most other gems, but in a round or oval form with convex surface. The pieces desirable for cutting rarely reach a large size so that big gems of Turquoise are comparatively unknown.

Much of the so-called Turquoise used in former times was bone-turquoise, or odontolite, made from fossil bone colored by a phosphate of iron. It is obtained mostly from the vicinity of the town of Simor, Lower Languedoc, France. It is sometimes known as Western or Occidental turquoise, in distinction from the Oriental turquoise, most of which came originally from Persia. It does not retain its color by artificial light as does true Turquoise and may be further distinguished by giving off an offensive odor when heated, owing to decomposition of animal matter. Further, it is lighter than true Turquoise and does not give a blue color with ammonia when dissolved in hydrochloric acid, as does true turquoise.

The finest Turquoises have long come from Persia, from a locality not far from Nishapur, in the province of Khorassan. Here the mineral occurs in narrow seams in the brecciated portions of a porphyritic trachyte and the surrounding clay slate. There are several hundred mines in the region and the entire population of the town of Maaden derives its livelihood from mining and cutting the stones. It is said that \$40,000 worth of stones are taken from these mines annually. A pound of stones of the first quality sells at the mines for about \$400 and is worth more than double that price in Europe. There are other Turquoise mines in Persia, but their product is comparatively

small. "Persian Turquoises" have, however, the highest value of all. Other Oriental localities from which the gem Turquoises are obtained are Sinai, in Arabia, the Kirgeshi Steppes, in Siberia, and the Kara-Tube Mountains, in Turkestan. Egypt also furnishes large quantities of Turquoise, which does not as a rule retain its color well.

Turquoise is not an uncommon mineral in the United States and many gems of fine quality have been obtained from mines within our borders. The oldest and best known mines are those at Los Cerrillos, New Mexico. This locality was long worked by Indians and Spaniards, as shown by the great extent of the excavations. There are pits two hundred feet in depth and piles showing that thousands of tons of rock have been broken out. Fragments of Aztec pottery, vases, cooking utensils, stone hammers, etc., are found at the mines, and trees of considerable size have grown over the once worked portions. Hence the beginning of the mine workings must at least date back prior to the discovery of America. The mines were worked more or less by Spaniards in the early part of the seventeenth century with the consent of the Indians, or at least without hindrance from them. In 1680, however, a large landslide occurred on the mountain at the mine, and many of the Indian miners were overwhelmed. Believing the Spaniards to be in some way responsible for the accident, and perhaps fearing that their gods were displeased, the Indians rose in their might and expelled the Spaniards from the region. It is one of the few instances in the history of Spanish conquest in America in which the Indians came off victorious. The Indians seem to have prized the Turquoise highly as an ornament, rudely polishing it and using perforated pieces like the one shown in the plate for necklaces. They also decorated their idols and other objects of worship with pieces of Turquoise. The mountain at which the Los Cerrillos Turquoise mines occur is called Mount Chalchihuitl, in allusion to an Indian name that is supposed to have been applied to Turquoise. The mountain is evidently of volcanic origin. The color of most of the Turquoise from this locality is apple-green rather than the highly

prized blue, but some gems of a good blue have been obtained. Mr. Geo. F. Kunz, writing in 1890 of the sale of gems from this locality, says that the Indians usually dispose of them at the rate of twenty-five cents for the contents of a mouth, which is where they usually carry them. Several other localities in New Mexico are worked for Turquoise. In Cochise County, Arizona, is a locality known as Turquoise Mountain, where considerable mining is carried on. Turquoise is also mined in Gila County, Arizona; Lincoln County, Nevada, and San Bernardino County, California. Several of these localities have been opened up recently, the present popularity of the gem perhaps having stimulated its output.

The much higher price commanded by Turquoise of a blue color has led to a counterfeiting of this color by staining green Turquoise or other stones with Prussian blue.

Mr. Geo. F. Kunz in his "Gems and Precious Stones of North America" describes a method of detecting this stain. It consists in washing the stone with alcohol and, after wiping it, to remove any grease, laying it for a moment in a solution of ammonia, when the blue color, if artificial, will largely disappear.

At how early a date Turquoise began to be prized as a gem is not known. The word Turquoise is a French word meaning Turkish, or a Turkish gem, and came to be applied because the gem was introduced into Europe by way of Turkey. It is probable that the gem has been in use from the remotest past among Oriental peoples and it is certainly still highly prized by them. Not the least of the reasons for which it is held in high esteem by them as well as by many Occidental individuals is the good fortune it is supposed to bring to its possessor. One of the proverbs of the Orientals is, "A Turquoise given by a loving hand carries with it happiness and good fortune," and another, "The Turquoise pales when the well-being of the giver is in danger." Numerous other superstitions cling around the Turquoise. One of these, due probably to slight changes of color which the stone may undergo under certain climatic influences, is that if the owner of a Turquoise sickens it will grow pale, and at his death lose its color entirely, but it

will regain its color if placed on the finger of a new and healthy master.

In Germany the Turquoise is said to be in much favor for engagement rings, owing to the belief that if either party prove inconstant the stone will make the fickleness known by weakening in color. It is curious that of the two non-crystallized gems, Turquoise and Opal, one should be considered lucky and the other unlucky. Both are more liable to

changes of color than other gems, and this fact has probably led to the ascription of good or ill fortune to them. In the folk lore of the months Turquoise is connected with the month of December, as the following rhyme bears witness:

If cold December gave you birth,
The month of snow and ice and mirth,
Place on your hand a turquoise blue,
Success will bless whate'er you do.

OLIVER CUMMINGS FARRINGTON.

TO THE MEADOW LARK.

Up from dewy grass,
while yet 'tis dark—

On trembling pinions,
soars the meadow lark;

His brilliant vest
like ruddy orange glows;

From slender throat,
the liquid music flows.

Dear flute-like warbler
of the wood and field,

Before him all his rivals
bow and yield!

The ambient air, with
fluttering wing he beats;

- With song ecstatic,
early morn he greets.

High, high he
rises; and his peans float,—

While listening Nature
revels in his note.

—J. Mayne Baltimore.

THE OUTRAGED BIRD.

Once upon a time, nearly seventy years ago, a little boy in a New England town was given a gun on the condition that he must not shoot any birds except those that robbed the corn fields. In those days farmers thought that the crow, brown thrasher and crow-black-bird stole so much grain that it was right to kill them and therefore a bounty, large for that time, of twenty-five cents was offered for every crow destroyed. Nowadays we are wiser and this very boy who has grown into a tall, gray haired, tender hearted man, says that there is not a bird living that is not more of a blessing than a curse.

But to go on with my story. The little gunner went out one day to see what he could hit with his new gun. About a quarter of a mile from the house he spied a little bird in a tree on the edge of the woods. He took aim and fired. He did not kill the bird, did not even seriously wound it, only injured one of its wings. The bird dropped down at his feet and

began chirping and scolding as if to demand an explanation.

The boy tried to get away but every time he moved aside the poor little outraged creature hopped in his path, never ceasing his vehement, indignant protest against the unwarrantable deed.

Finally the conscience-smitten boy, seeing that there was no escape for him and pitying the wounded condition of the bird, killed it outright, carrying away in his throat a great lump and in his heart a sharp pain that will never die out. Although he is now over eighty years of age he says that he would gladly give all the money he owns if he could undo that one thoughtless act.

When a bird can say so plainly that his life is his own and no one has a right to wantonly take it from him, what must have been the thought of that bird's loving Creator, without whose knowledge and pity not even a sparrow falls to the ground!

FANNIE SKELTON BISSELL.

NICODEMUS.

Nicodemus was a pet blackbird. A sleet storm broke the bough on which the nest was built, and all the birds, save one, were killed in the fall. This one, Nicodemus, was placed in an old hat lined with wool, and kept near the fire until he was ready to fly about the room. He was an apt scholar, and soon knew his name, responding readily to every call. When the weather became warm he was allowed the freedom of the yard. Whenever his mistress saw a stray cat about she would go out on the porch to his cage, strike upon it, and call: "Nicode-

mus!" "Nicodemus!" whereupon the bird would fly into his cage for safety.

One day an aged gentleman called at the house. Nicodemus came into the parlor. At first he nestled upon his mistress' shoulder, but his curiosity seemed much excited, and he soon flew to the old gentleman, alighted upon his bald head, when he began a vigorous scratching.

"For shame, Nicodemus! Come here at once," cried the lady. He obeyed, but with a really abashed look.

BELLE PAXSON DRURY.

A WEED PICTURE.

To one who cares little for natural objects a bit of bottom land in autumn has few attractions, but to the botanist of experience or to a student of nature, from late July till the first frost comes, such a place is a continuous delight.

Perhaps you have seen this very picture. If so, have you studied its details?

A half acre of swamp, which in the springtime presented a dainty background of yellowish green willows and a foreground of green pasture dotted with dandelions and blue violets, has now transformed itself into a Persian effect of gorgeous color. Blue, pink, brown, green, red, purple, white, lavender, yellow, orange brown, and these through tintings and shadings that a modern Titian would never produce, even should he wear his brush to a stub, for the very simple reason that he couldn't.

Plant life has here run riot and because of their dense growth the varieties are almost unaccountable.

Among the showier members of this very mixed growing effect, in color, brightest is purple iron weed and the helianthus.

But joe-pye weed tosses up his woolly pink head and flauntingly asks, "With that big yellow and black butterfly on my crown am I not more showy than they?" He has to be gently reminded that all his brothers are not wearing butterfles, which fact leads to a negative decision—still he is a beauty.

Then the corners festooned with clem-

atis, hop bindweed and even dodder give to the raw edges a finish that cannot be excelled. Little dots of cardinal, here and there, show a belated cardinal flower and bitter sweet just ready to open hangs over the elder bushes, which form one edge of this picture.

The paler asters in eight or ten shadings, with the exception of the New England variety, begin to fill in the neutral patches, and golden rod is waving yellow plumes here and there. It is a beautiful color, but looks rather pale compared to the later sunflowers. Bonaset and yarrow and spurge each have a place, and great bunches of bedstraw fill up the crannies till not a square inch of earth is visible.

Some of the plants which help complete the perfect whole but which are less numerous and showy, are the tall dead stalks of angelica, parsnips in seed, milkweed, ragweed, mallow, nettles, vervain, blackberry, and wild rose with scarlet bolls; and this flanked on another side by the densest of willow and thorn.

Some of the finishing touches to this composite picture are the huge green dragon flies, the brilliantly colored butterflies and moths, and the catbirds and bird kindred which live in the heart of all this magnificence, but manage to keep well on the wing, especially when the sun shines bright and the air is soft and cool, and on days when a deep blue sky with great white clouds is the canopy.

MARY NOLAND.

The air is full of hints of grief,
Strange voices touched with pain—
The pathos of the falling leaf
And rustling of the rain.

—Thomas Bailey Aldrich, "Landscape."

LIBRARY
UNIVERSITY OF ILLINOIS



STRIPED HYENA.
(*Hyaena striata*).

THE STRIPED HYENA.

(*Hyaena striata*.)

The first Hyena in which I became interested lived in a zoölogical garden connected with a well known park.

I cannot claim that she was a beautiful creature for, if all must be told, she had the same ugly appearance of every other Striped Hyena. And yet her very ugliness made her somewhat interesting. She would look at me from her slanting eyes with an unsteady, uncanny expression. Her thick head and neck, her stout body, her shorter hind legs and longer front ones, causing her back to slope from shoulder to tail like a small toboggan slide, gave her an extremely awkward look, I admit; and then she had but four toes on each foot as is the case of all members of the hyena family. Her body was covered with rather long coarse hair of a yellowish gray color striped with black, her tail was short and bushy, and along the spine the hair grew long and stiff, making a sort of mane. Her ears were large, erect and devoid of hair, and her voice—well! it was something to startle the uninitiated. There were shrieks, murmurs and growls, sometimes hoarse and sometimes shrill, and yet I am told that it is mild and musical compared with the ghostly laughter of her cousin, the spotted hyena, and yet her voice is not pleasant to hear.

In spite of all these characteristics I was interested in Mrs. Hyena, perhaps on account of her unhappy lot, for she was not loved as were other animals around her. There was Duchess, the elephant, Major, the lion, and other favored ones whose personality was recognized, as they all had names and they received much attention. But Mrs. Hyena had no name, for the keeper declared that she was such a miserably cowardly mean creature that she was not worth one.

She was only the "Hyena" to him, though he had cared for her for many years and sometimes had been obliged to put her in the hospital because her mate had mauled and punished her so badly.

And was she not to be pitied because she was so far from those of her own kind? for hyenas are not native in the new hemisphere and to seek her own, she would be obliged to cross the ocean to the coast of Africa. There she would find many of her own kind and should she cross into southern Asia as far as the Bay of Bengal she would still find many friends, while in central and southern Africa her cousin, the spotted hyena, would be plentiful, and at the south, along the western coast, her other cousin, the brown hyena, would be found.

In spite of the large area in which the various members of the family may be found a traveler may be in the country some time without seeing one, for they are nocturnal in their habits, hiding by day in their haunts among the rock-cut tombs in Syria and Palestine or among holes and caves in the rocks in other countries, sometime lurking among ruins, but more often inhabiting a den made by digging a hole in the side of a cliff or ravine.

But at night it is heard, if not seen, as it goes forth to seek its food. It prefers food already killed and only attacks a living animal when driven to it by lack of carrion. Its powerful jaws enable it to crush the bones which other animals leave. As the cleaning up of the world must be done in some way for the good of all, can we not believe that the hyena has an important mission to fulfil in spite of the strong feeling against it? It takes what other animals leave and is the vulture among beasts.

There seems to be little known about the brown hyena. It is found in a comparatively small region and is in some respects like the spotted hyena though it is smaller, being about the size of the Striped Hyena.

The spotted hyena is the largest of the three, the most ferocious, stupid and cruel. Owing to the legs being nearly of the same length it is less awkward than the striped species.

There are no animals about whom there are so many superstitions. Even Pliny, writing in the first century, tells us that it "imitates the human voice among the stalls of the shepherds; and while there learns the name of some one of them, and then calls him away and devours him." It is also said that coming in contact with its shadow, dogs will lose their voice, and that, by certain magical influence "it can render any animal immovable round which it has walked three times." The Arabs "believe that people who partake of the brain of the hyena become insane, and the head of a hyena is always buried lest it should be used by wicked sorcerers for their diabolical charms."

They also believe that the hyena "are sorcerers in disguise, who assume human shape by day and prowl around as hyenas by night, working destruction upon good people."

The stories of the body snatching propensities of the Striped Hyena are much exaggerated. If this occurs at all it is when the body is very lightly covered with sand and when other food is lacking.

The dislike for the hyena seems to exist wherever the animal is found. In many parts of India, when killed, the body is treated with every mark of indignity and then burned.

And yet the striped species is capable of great attachment. Colonel Sykes states that "in certain districts in central India it is as susceptible of domestication as ordinary dogs." And Dr. Brehm, who found every created animal interesting, once had two young hyenas for pets; but I will give the narration in his own words. "A few days after our first

arrival in Khartoum we purchased two young hyenas for a price equal to twenty-five cents in American money. The animals were about the size of a half-grown terrier, clothed in a very soft, fine woolly fur of dark gray hue and they were very spiteful, notwithstanding they had enjoyed human society for some time. We put them in a stable and I visited them daily. At first they were addicted to vicious biting, but repeated sound blows overawed their resistance, and three months after the day of purchase I could play with them as I would with a dog, without having to fear any mischief on their part. Their affection for me increased every day and they were overjoyed when I visited them. When they were more than half grown they signified their pleasure in a very strange manner. As soon as I entered the room they rushed at me with a joyous howl, put their fore paws on my shoulder and sniffed my face.

"Later on I led them by a single string through the streets of Cairo, to the horror of all good citizens.

"They were so affectionate that they often paid me a call without being invited and it made a surprising as well as uncanny impression on strangers to see us at the tea table. Each of us had a hyena at his side and the animal sat on his haunches as quietly and sensibly as a well behaved dog who pleads for a few scraps at the table. The hyena did that also, and their gentle request consisted of a low but very hoarse cry. They expressed their gratitude either by the same sounds and actions they used in greeting me as above described, or by sniffing my hands.

"They were passionately fond of sugar, but also had a great liking for bread, especially if it was soaked in tea. Their usual food was Pariah dogs, which we shot for the purpose. My pets were on good terms with each other. If one were absent for any considerable length of time there was great joy when the two met again; in short, they proved to me quite conclusively that even hyenas are capable of warm attachment."

JOHN AINSLIE.

A BIRD INCIDENT.

A common bird with us is the pheasant and one of the most interesting incidents of my life was in connection with a family of pheasants.

Crossing a woodland one summer evening, making the dead leaves rustle beneath my feet, I looked down, I hardly know why, but it must have been in order to save the little innocents. For the brown leaves seemed to me to be alive, very much alive, indeed.

I stopped, dropped to a sitting posture, and reached forth my hand, and to my surprise they never tried to get away, but cuddled up in a little frightened flock right to my feet. I gathered them all into my dress, twelve of them, cunning little midgets, not larger than the end of a man's thumb, and awaited developments.

The parent birds were near and soon the mother began crying with a pitiful call. I couldn't imitate it in any way, but

it expressed tenderness, concern and fear. Soon an angry frightened bird whirled over my head, again and again, each time nearer until she almost knocked off my hat; she passed and getting just in front of me, made feint of a broken wing, and lay apparently helpless a little ahead. I never saw anything more expressive of anxiety than the actions of this bird. I could not bear to tease her, so setting the birdlings on the ground I withdrew to a position where I could see the united family and watched the mother love as it went out to the helpless brood. The words of the Master, "Oh, Jerusalem! Jerusalem! how often would I have gathered thy children together even as a hen gathereth her chickens and ye would not," never before came to me with such force. Truly the maternal instinct, next to love of the Divine, is the most sacred thing in the world.

MARY NOLAND.

GROUSE.

The name Grouse is supposed to come from gorse—furze or heath—and is applied to many game birds in the family Tetraonidae.

The great majority of Grouse belong to the northern part of America, but in England the Grouse may be said to have had an effect upon history, as parliament used always to rise when the season for shooting Grouse arrived!

The red Grouse is indigenous to Great Britain, but is represented in other northern countries by the Willow Grouse, which assumes a protective white color in winter, except that the tail remains black.

The Ruffed Grouse, or pheasant, has caused much dispute in reference to how it produces the drumming sound which can be heard at a long distance, and which musical exercise is no doubt intended as a noisy courtship in wooing his mate.

The distinctive name, "Ruffed," comes from the ruff of dark feathers, with iridescent green and purple tints which

surrounds the neck. This bird has a slight crest and a beautifully barred tail. Its note is a hen-like cluck. No bird has handsomer eyes, with their deep expanding pupils and golden brown iris.

In a beautiful ravine—which was carpeted with green moss a foot deep and shaded by evergreen trees hung in soft gray mosses—on an uninhabited island in northern Lake Superior, I once saw some Canada Grouse so tame that it appeared as if they might easily be taken in one's hands. The parent birds were on one side of the trail, the young ones in a tree on the other side. All kept quite still for me to look at them, only the young ones lifted their wings slightly, as if wishing to fly across to their parents, who seemed to have an expression as of astonishment at seeing so strange a sight as a human being in their unfrequented solitudes. The gentlemen of our camping party declared that these Grouse were so tame it would seem a crime to shoot them.

THE GIRAFFE.

(*Camelopardalis giraffa.*)

Should a traveler returning from a far country describe a wonderful animal, with the head and body of a horse, neck and shoulders of a camel, ears of an ox, the tail of an ass, the legs of an antelope, and the coloring and marking of a panther, he would be believed with difficulty, and yet this combination very fairly describes the curious and interesting animal known to us as the Giraffe.

This name is a corruption of the Arabian *serafe*, the lovely one, and while a single animal, away from its natural surroundings, may not seem to merit the appellation, in its native woods it produces a very different impression.

The Giraffe is found in a wide curve, extending over the eastern half of Africa from Ethiopia as far south as the confines of Cape Colony. Within this area it frequents the sandy, desert-like portions where small trees and shrubs abound.

Hunters and explorers describe with enthusiasm the appearance of the herds of Giraffe, which are sometimes in groups of six or eight, but more frequently found in larger numbers, often as many as thirty or forty being together, while one traveler in the Soudan counted on one occasion seventy-three, and at other times one hundred and three and over one hundred and fifty in one herd.

Gordon Cumming tells us that "when a herd of Giraffes is seen dispersed in a grove of the picturesque, umbrella-shaped mimosas, which adorn their native plains, and on the topmost branches of which their immense height enables them to browse, the observer would really be deficient in appreciation of natural beauty if he failed to find the sight a very attractive one."

The Giraffe is curiously like the natural objects of the locality in which he lives. He is found in stretches of coun-

try where half decayed, weather beaten, moss covered trees resemble the long necks of the animal; so much so that Cumming says he was often in doubt as to the presence of a whole troop of Giraffe until he had used his spyglass, and he adds: "Even my half-savage companions had to acknowledge that their keen, experienced eyes were deceived sometimes; either they mistook those weather beaten trunks for Giraffes, or else they confounded the real Giraffes with the old trees."

Though found in wooded sand belts which are waterless a portion of the year, the animal of necessity avoids the tall, dense forests, for its food is chiefly the tender leaves and buds of low-growing trees, especially the leaves of the mimosa and of the prickly acacia.

These trees are seldom more than twelve or fifteen feet in height, and with its long legs and neck the Giraffe can easily reach the appetizing twigs and leaves on the broad flat top of the tree. Moving from one side to another, as if the tree were a table spread for its use, it throws out its long snake-like tongue, which it can manipulate with great dexterity and which it uses as an elephant does its trunk. When we remember that the largest animals are sometimes eighteen feet in height, and that the tongue is seventeen or eighteen inches in length, we can see how easily the Giraffe can take its breakfast, while the tree that furnishes it serves also as a screen or shield to conceal it from its enemies.

From the fact that the giraffe will abide in localities which are waterless for months at a time, it has been supposed that water was not necessary for its comfort. This is far from the truth, and it has frequently been seen to drink; its appearance when drinking is most



LIBRARY
UNIVERSITY OF ILLINOIS

peculiar, and one who has witnessed the curious operation tells us that although the animal's neck is so long, it can not reach the water without straddling its legs wide apart. This it does by placing one foot forward and the other as far back as possible, increasing the distance between them by a series of little jerks, and sometimes they sprawl their legs out sideways in a similar manner.

It is at the watering place that the lion lies in concealment waiting for the Giraffe to appear. Should it remain unconscious of the lion's presence, the victory is to the lion, but in the open the Giraffe has an equal chance with the "king of beasts," for it can defend itself valiantly and successfully with vigorous blows from its powerful limbs. The small horns are not used as a means of defense; they are covered with skin, and at birth the bones are separate, becoming attached to the skull at a later period, while the third small horn, especially observable in the male, is really no horn at all but only a thickening of the bone at that point.

The head of a Giraffe is really a thing of beauty. On account of the delicate contour of the muzzle the head appears longer than it really is. The nostrils can be opened and closed at will, making it possible to avoid injury from the sand storms which sometimes prevail. The eyes are the largest for the size of the head of any animal and are wonderfully gentle, lustrous and beautiful. They are also capable of some lateral projection so that to a degree the animal can see behind it without turning its head.

Notwithstanding the extreme length of the neck of the Giraffe it contains but seven bones, the same number as man.

Its sloping back has led some people to suppose that the legs were uneven in length; this is an error, as the legs are about the same length and the feet have delicate, beautifully shaped, divided hoofs.

The tail of the animal is long and finished with a generous tuft of hair with which it relieves itself of the seroot flies and other stinging insects which otherwise would become unbearable.

Like the American bison the Giraffe is in danger of extermination. It originally had a larger range but has been

killed in great numbers. The temptation to hunt the animal is not to be resisted, as the hide of the bull brings from twenty to twenty-five dollars, the flesh is very fine eating and the other parts of the body can be put to various uses; the Arabs use the tendons of the legs for sewing leather, the tail-tufts are used for fly brushes and the solid leg bones are in England made into buttons and other bone articles.

The Giraffe is difficult to approach for it is extremely wary, and will place sentinels to give the herd warning of approaching danger. It is a rapid runner, although its gait is shambling and peculiar owing to the fact that it moves like a pacing horse, the fore and hind legs of the same side moving together.

It is usually hunted on horseback and the animal must be pressed from the moment he starts; "it is the speed that tells against him, and the spurs must be at work at the commencement of the hunt and the horse pressed along at his best pace; it must be a race at top speed from the very start, for should the Giraffe be allowed the slightest advantage for the first five minutes the race will be against the horse."

Europeans and natives alike are fascinated with Giraffe hunting, though few fail to be struck with the pathetic and half-reproachful expression of a fallen animal and few hearts are so hardened as to feel no compunction at "destroying one of the noblest specimens of nature's handiwork."

Mr. Selous, after hunting one day, in recounting his experiences says: "Even in the ardor of the chase it struck me as a glorious sight to see those huge beasts dashing along in front, clattering over the stones or bursting a passage through opposing bushes, their long, graceful necks stretched forward, sometimes bent almost to the earth to avoid horizontal branches, and their bushy black tails twisted over their backs. And how easily and with what little exertion they seemed to get over the ground, with that long, sweeping stride of theirs!"

The skin of the Giraffe is in many parts so thick that a bullet will not pierce it, and the surest method of hunting it is that pursued by some of the Arabs of Abyssinia who run it down while gal-

loping at full speed and with their broad-swords cut the tendons of its legs, thus completely disabling it. Although the natives love to hunt the animal they love still more to own a living one and their heads may often be seen peering over the inclosure in the native villages.

In 1836 four Giraffes were successfully taken to the zoölogical gardens at Regent's Park, London. From this time they became somewhat common in menageries so that many people have seen

the living animal, but all view it with curiosity as did the old Romans in the time of Julius Cæsar, when individuals were brought to Rome on the occasion of the games. And it is not strange that at a later date the picture of this curious and then unknown animal, found on Egyptian monuments, were pronounced "a dream fancy of an unbridled artistic imagination."

JOHN AINSLIE.

THE FLAG.

I plucked a flag, half open
To the sunlight it waved and blew,
And bent o'er the water beside it
Where the sweet pond-lilies grew.
The stem broke short in my fingers,
The bloom remained in my grasp,
But the life of the swaying pretty thing
I tried in vain to clasp.

The breezes were floating gently by
The calm, peaceful waters reflected the sky;
The flag-stalk nodded its flowerless head,
In my hand lay the blossom withering, dead.

I stood for a moment longing
As I seldom had longed before,
Longing for even the life that was gone
To return to that flower no more.
But the breezes bent over me softly
And whispered, the lost is found,
For whatever you pluck from the surface
Is restored once more in the ground;

For the gardens of earth hold blossoms more fair
Than the one you have plucked and are holding there.

—Ella Van Fossen.

IN THE HOLLOW OF HIS HAND.

(From an Ornithologist's Year Book.)

So tiny that a child's small palm can cover its whole body, inaudible at a few paces' distance, invisible till it rises at your very feet, such is our yellow-winged sparrow. Yet he is a marvel; his plumage shows an exquisite mimicry of the earth tints, "the upper parts mixed black, rufous-brown, ashy and cream-buff," with a touch of "yellowish olive-green" for the herbage, and here and there an orange or yellow shade, and a dusky whiteness beneath, to give the effect of light. What could be more perfect? No wonder the wee householders, with a nest of fine-woven grasses, low upon the ground, sits unseen on her "clutch" of wee speckled eggs within reach of your fingers. She knows this well, and will not rise until you are almost upon her retreat. Nor will she fly far. A fence post, a low shrub will serve as her watchtower until danger is over.

Our yellow-tinted sparrow has another name, the "Grasshopper Sparrow," from its insect-like tremolo and chirp. Its song is a chord or two and a long trill on the insect letter, z. It is sung, to the eye, with a hearty abandon of joy, the head thrown back and mouth open, in a fine pose of ecstasy; yet, unless all around is

still, and you listen with attention, not a sound will you hear, so small and fine are the vibrating tones. It is said, in a story of the Highlands, that on certain nights, if a man will but lay a couchant ear close to the breast of the earth, he may hear the fine, fine piping of the fairy tunes played in the underworld. Our bird's song is one of these faint, sweet voices of the earth, like the music that breathes from every clod or leaf when the old world lies dreaming and dozing in a bit of holiday after work is done on a warm, sunny afternoon in autumn, a musical, tremulous, sweet piping everywhere.

Yet not one of these small creatures is forgotten before its Father. When the frost is in the air; and winter is near, the Divine impulse stirs in its breast, and its little wings will bear it far, far away in the long, mysterious journey over sea to the warm islands of the Atlantic. There it will sing for joy with its fellows in the sun, but when April returns, look well. Is there not a stir in the short grass? And listen. The faint, dream-like thrill throbs again in the throat of the sparrow, and our ground-dweller has returned. It is a parable of God's care for His little ones.

ELLA F. MOSBY.

SONG OF THE STORMY PETREL.

When in the hollow of His hand
All calm doth lie the deep,
Alone and out of sight of land,
Upon the wave I sleep;
Above, the sun resplendent shines;
Beneath, old ocean heaves;
I feel alike the smile of heaven
And some great heart that grieves.

I drift afar by sun and star;
I care not where I be
So long as throbs the giant flood
Of ocean under me.
The ancient sea my brother is
And well I know his moods;
For everywhere with him I fare
Throughout his solitudes.

I lay my heart unto his heart,
I soothe him with my wing;
I kiss the tide as I were bride,
And to him low I sing.
He speaks to me of mystery,
Of days when he was young,
Of sorrows old, of tales untold
By any other tongue.

I listen, yearn, and much I learn
Of nations now no more,
Of wrecks that sleep down in the deep
Or strew the rocky shore;
Of how grim Time makes him to mar
Whatever coast he laves.
Of how the sea he makes to be
So full of nameless graves.

Since goaded long by lashing winds,
He rushes forth in ire,
And welds as one the ships of Clyde
With those of crumbled Tyre;
And swallows down the king and clown
With equal appetite,
And hides them all, both great and small,
In his wide tombs of night.

Then screaming I above him fly
And hasten where he roars,
Within my breast the same unrest
As his proud bosom gores.
A thousand leagues I go with him
And glory in his power,
A thousand leagues I herald him
Through many a sleepless hour.

Then, calmer grown, we dream again,
And in some distant zone
A little season are as one,
Untroubled and alone.
For I am brother to the sea
And where he goes go I,
And when at last my days are past,
Within his breast I lie.

And I shall ever haunt his paths
About this aging earth,
And he to me, and I to him,
Shall sing of woe and mirth
Until gray Time shall be no more,
And every wave that weeps
Has learned to laugh and laughing, thrills
The bosom of the deeps.

—C. G. B. in "*The Chicago Record*."

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



THE SPIDER MONKEY.

(*Ateles hypoxanthus*.)

With his native guides a gentleman was traveling one day through one of the wonderfully luxuriant tropical forests of eastern Brazil. They had left the Amazon river and had come southeast to the province of Maranhao, where the roots, grasses and plants sometimes weave themselves into vegetable bridges so solid that a man may go some distance without discovering that he has left the firm earth.

They had just passed over one of these natural bridges and had evidently reached the edge of the hidden pool, as they came to a dense growth of rosewood trees, and there they saw a most unique and peculiar sight. The gentleman, being a stranger in Brazil, exclaimed with astonishment, for hanging from the branches by their tails only, were a whole troop of monkeys.

They were of slender build, with long, thin, sprawling limbs and small heads, and they were indeed a most laughable and comical sight.

As soon as the gentleman recovered from his surprise he fired upon the troop and succeeded in slightly wounding one which so maimed it that, uttering a loud yell, it fell to the ground and he was able to secure it. The others, frightened, quickly vanished, for their movements were of surprising agility; they threw their long limbs about in the queerest sort of a manner, using their tails in climbing more than their limbs, seeming to feel their way with the tip of the tail and finding a place for support, they swung themselves rapidly to the extreme tree tops and were out of sight in less time than it takes to describe their flight.

When the troop could no longer be seen the gentleman examined his wounded captive and from what he knew of the characteristics of the ape family, to which all monkeys belong, he decided that without question he had secured a specimen of the Spider Monkey.

It was a young mother and the baby

monkey was clinging to her with its little arms around her neck and legs around her hips in a way not to impede her motions.

She was carefully examined by her captor and he soon decided that the wound was not dangerous and that with care he might be able to take her with her baby back with him to the United States.

So she now received the best of care. She was secured with a rope attached to a bit of silken handkerchief which was carefully fitted to her leg and soon recovering (for her captor was a skillful surgeon) she became the pet of the company.

In length she was about four feet four inches and she was covered with a dull yellowish woolly fur. Her face was quite brown, which proved that she was still young, for the face grows dark gray in old age. In examining the forepaw, in order to find a thumb, nothing was there except a short stub devoid of a nail; her nose was broad and flat and she had thirty-six teeth.

Surely she was a Miriki Spider Monkey and a fine specimen at that, but as this variety is usually found only farther south in Brazil, her captor was especially pleased to secure her.

It would take a long time to narrate all the interesting things which one could say about her, but I must tell you what a devoted and lovely mother she was to her helpless little baby. It was as funny a little thing as you can imagine, ugly as possible, with proportionately long arms and legs and a face so old looking and wrinkled that it reminded one of an antiquated grandfather rather than of an infant monkey. She would continually pet this little monster, lick its body, hug it and fondle it; she would hold it in both hands as if admiring it and then would rock it to sleep in her arms. The children of royalty could not have more tender care and attention than the little Brazilian monkey gave her offspring.

As it grew she allowed it a little freedom, and usually it was very docile, obeying her every call; but when disobedient she would slap it and give it a box on the ear; but this seldom happened, for a monkey child is a model child and might serve as an example to many human children.

But I think you would have found it extremely odd could you have seen her eat. She would frequently take fruit, or anything offered, with her long, prehensile tail and curling the end around the object, would convey it to her mouth. She would eat almost everything eaten by her captors, but would not reject an occasional insect, spider, or even a young bird.

Happiest when permitted to hang on the tree boughs, she would drink from the overhanging branches without touching the ground. In fact she was only perfectly at home when climbing around the trees, as she was comparatively awkward when on the ground, walking on all fours in a somewhat clumsy manner. Like all Spider Monkeys, she was of a gentle, teachable disposition, for all South American monkeys lack many of the mischievous and disagreeable traits of their African cousins, though as a rule they

are not as bright and vivid in color and are duller and more indolent in their nature.

On the other hand the American monkeys do little damage to man, for the vast forests which form their home (they are found in the warm countries of Mexico, Central and South America, and never in a very high altitude) provide for them so fully that they have no need of man's help. The natives depend very much on monkey meat as a food and hunt them with bow and arrows, while travelers are often obliged to subsist upon monkey roasts for weeks together and do not find them very bad fare.

Aside from the Miriki Spider Monkey, of which our little mother was so interesting a specimen, the traveling party from time to time encountered other species of the Spider Monkey, of which there are many. All have similar characteristics but vary somewhat in size and color.

You will be interested to know that the monkey mother and her funny baby were finally brought in safety to the United States, where as far as I know, they are still living and are happy and much treasured pets.

JOHN AINSLIE.

NOVEMBER.

Though I sorrow it to say,
November is a churl alway,
Miserly, beside the fire,
Just outside the echoing choir,
Sits he peevishly, and ponders
On this life and all its wonders,
Hearing through the grudging screen
Organ notes, that slip between
Prayers for dead men and dead hopes,
While the priests, in 'broidered copes,
Sing to heaven; yet not for him
Goes up the incense or the hymn.

Fie, November!

—Walter Thornbury, "The Twelve Brothers."

BIRDS AND NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. X.

DECEMBER, 1901.

No. 5

SNOW-FLAKES.

Out of the bosom of the Air,
Out of the cloud-folds of her garments shaken,
Over the woodlands brown and bare,
Over the harvest-fields forsaken,
Silent, and soft, and slow
Descends the snow.

Even as our cloudy fancies take
Suddenly shape in some divine expression,
Even as the troubled heart doth make
In the white countenance confession,
The troubled sky reveals
The grief it feels.

This is the poem of the air,
Slowly in silent syllables recorded;
This is the secret of despair,
Long in its cloudy bosom hoarded,
Now whispered and revealed
To wood and field.

—Henry Wadsworth Longfellow.

O wonderful world of white!
When trees are hung with lace,
And the rough winds chide,
And snowflakes hide
Each break unsheltered place;
When birds and brooks are dumb,—what then?
O, round we go to the green again!

—G. Cooper, "Round the Year."

THE WHITE-EYED VIREO.

(*Vireo noveboracensis*.)

"And then the wren and vireo
Begin with song to overflow."

—THOMAS HILL—"Sunrise."

The vireos form a peculiar and interesting family—the Vireonidæ, which includes about fifty species. All are strictly American and the larger number inhabit only the forest or shrubby regions of Central and South America. The name vireo signifies a green finch and is from the Latin word meaning "to be green." The body color of nearly all the species is more or less olive green.

About fifteen species frequent the United States. These are all members of the genus *Vireo*, and some of them have a wide range, only equalled in extent by some of the warblers.

Dr. Cones has said of these birds: "Next after the warblers the greenlets (vireos) are the most delightful of our forest birds, though their charms address the ear and not the eye. Clad in simple tints that harmonize with the verdure, these gentle songsters warble their lays unseen, while the foliage itself seems stirred to music. In the quaint and curious ditty of the white-eye, in the earnest, voluble strains of the red-eye, in the tender secret that the warbling vireo confides in whispers to the passing breeze, he is insensible who does not hear the echo of thoughts he never clothes in words."

The vireos are strikingly alike. In habit, in color, in structure, in size and in their home-building peculiarities they resemble each other. Their eggs are similar and "fashioned almost as from the same mold, and colored as if by the same brush."

The vireos build pensile nests that are ingeniously concealed under the surrounding foliage. They are in the form of a rather deep cup, which is suspended from two or more converging twigs. The materials used in the construction are

similar in all cases, though they vary somewhat according to the locality and the abundance of desirable textiles. A favorite substance used by some of the birds is the tough and flexible fibers of the inner bark of trees. Thoreau, speaking of this habit, says: "What a wonderful genius it is that leads the vireo to select the tough fiber of the inner bark instead of the more brittle grasses!"

The White-eyed Vireo has an extensive range, extending over the eastern United States from the Atlantic Ocean to the great plains and from Mexico and Guatemala, where it winters, northward to the borders of British America. It nests practically throughout its range within the United States.

This pert and trim little bird is known by other suggestive names. Because of the character of its nest it is called the "little green hanging bird." Its song, as translated by boys, has given it the name "chickty-bearer," or "chickity." Except when nesting this vireo is unsuspecting and will permit a near approach. Dr. Brewer says that "when whistled to it will often stop and eye you with marked curiosity, and even approach a little nearer, as if to obtain a better view, entirely unconscious of any danger." Impertinent at all times, they are especially so when the nest is approached. At such times it exhibits great uneasiness, and even its expressive eyes seem to flash. Continually scolding the intruder, it utters "a hoarse mewling that is very peculiar."

The nest of the White-eyed Vireo is a beautiful structure. It is artistic, durable and a wonderfully pretty home for its beautiful architect. It is seldom placed higher than five feet from the ground. Dr. Brewer thus describes one of these



LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO

ests. It was "composed of a singular medley of various materials, among which may be noticed broken fragments of dry leaves, bits of decayed wood and bark, coarse blades of grass, various fibers, lichens, fragments of insects, mosses, straws, stems, etc. These were all wrapped round and firmly bound together with strong hempen fibers of vegetables. Within this outer envelope was an inner nest, made of the finer stems of grasses and dry needles of the white pine, firmly interwoven." There are usually

either three or four eggs, which are white and speckled at the larger end, with black or some shade of brown.

Mr. Chapman says: "I have always regretted that the manners of this vireo have been a bar to our better acquaintance, for he is a bird of marked character and with unusual vocal talents. He is a capital mimic, and in the retirement of his home sometimes amuses himself by combining the songs of other birds in an intricate potpourri."

TO A WHITE-EYED VIREO.

Up there among the maple's leaves,
One morning bright in May,
A tiny bird I chanced to spy,
And plainly heard him say:
"Sweet, who-are-you?"

"Dost call to me, in words so fair,
O little friend?" I cried;
"Or to some feathered dame up there?"
For answer he replied:
"Sweet, do you hear?"

O yes, I hear you, little bird,
All clad in leafy hue;
And I in turn, would like to ask
The question, "Who are *you*?"

But you might deem the question vain,
And bid me note your size;
The shading of your dainty coat;
The color of your eyes.

For there I shall my answer find.
Shall you be answered, too?
Will your wee feathered love reply,
When asked, "Sweet, who-are-you?"

—Annie Wakely Jackson.

PLEA OF THE YOUNG EVERGREENS.

We hide the stony mountain side with green,
And grow in beauty where the plain was bare;
We cling to crannies of the walled ravine,
And through faint valleys waft a strengthening air.

On coastings gray we stay the creeping sand;
We lift our spears and halt the shifting dunes;
Our bounteous youth makes glad the scanty land,
While it transforms rank fens, and salt lagunes.

We veil the prairies from the heat, while slow
Across their farmsteads breathes our Summer balm,
And shield them when the winds of Winter blow,
And all our aisles and pleasant rooms are calm.

Through charming days we spread our branches wide,
And live through drouths, and floods, and whirling storms,
Till comes to man his merry Christmas tide,
That lays in myriad deaths our fairest forms.

Men drag us from our fragrant winding vales,
They fell us on the mountain slopes, and bare
The prairies unto heat, and freezing gales,
And thinned, the chaparral plains fail unaware.

They tear us from the wall-chinks of the glens,
And hew us on the marsh we helped to drain,
And where our beauty graced, the tawny fens
Shall lapse to weeds and sworded flags again.

Up coastings, line the lisping, creeping sands,
While inland move the dunes we bravely stayed,
When we are borne away by wasteful hands,
To tower in rooms, with lights and gifts arrayed.

Spare us!—oh! spare our youth, with verdure crowned—
Our groves return to deserts when we pass;
The coasts which we revived, in sands are drowned;
Bare slopes but yield their stones and bitter-grass.

Spare us! we bring you beauty, shelter, wealth,
Oh! waste us not. Oh! keep with guiltless show
The Holy Time; and life, and joy, and health,
Be gifts to you, while winds of Winter blow.

—Eliza Woodworth.

LIBRARY
UNIVERSITY OF ILLINOIS
CHAMPAIGN, ILL.



THE RIVOLI HUMMINGBIRD.

(*Eugenes fulgens*.)

In that wonderful and magnificent book "A Monograph of the Trochilidæ," the family of hummingbirds, Mr. John Gould, the author, writing of his experiences with these mites of bird life, says:

"How vivid is my recollection of the first hummingbird which met my admiring gaze! With what delight did I examine its tiny body and feast my eyes on its glittering plumage! These early impressions, I well remember, gradually increased into an earnest desire to attain a more intimate acquaintance with the lovely group of birds to which it pertained. During the first twenty years of my acquaintance with these wonderful works of creation my thoughts were often directed to them in the day, and my dreams have not unfrequently carried me to their native forests in the distant country of America."

These birds have ever been an inspiration to the poet. How beautiful are these lines of Maurice Thompson, addressed to the hummingbird:

Zephyr loves thy wings
Above all lovable things,
And brings them gifts with rapturous mur-
murings.
Thine is the golden reach of blooming hours;
Spirit of flowers!

Thou art a winged thought
Of tropical hours,
With all the tropics' rare bloom-splendor
frought;
Surcharged with beauty's indefinable powers,
Angel of flowers!

It seems cruel and strange that any person should kill these tiny creatures especially for ornamental purpose. They are the gems of nature, yet one day, in the year 1888, over twelve thousand skins of hummingbirds were sold in London. "And in one week during the same year there were sold at auction, in that city, four hundred thousand hummingbirds and other birds from North and South America, the former doubtless comprising a very considerable percentage of the

whole number." When we remember that the hummingbird lays but two eggs, the rapid extermination of some of the species is evident unless this wholesale slaughter is stopped. Even the tropics, where bird life is wonderfully abundant, cannot support such wanton destruction.

The Rivoli, or the Refulgent hummingbird, as it is frequently called, has a very limited range. It is found in the "mountains of southeastern Arizona, southwestern New Mexico and over the table lands of Mexico," southward to Nicaragua. It is one of the largest and most beautiful of the hummingbirds that frequent the United States. Its royal appearance led Lesson, in the year 1829, to name it Rivoli, in honor of M. Massena, the Duke of Rivoli. It is noted "for the beauty of its coloring and the bold style of its markings."

Mr. Salvin, writing of the pugnacious character of this species, says: "Many a time have I thought to secure a fine male, which I had, perhaps, been following from tree to tree, and had at last seen quietly perched on a leafless twig, when my deadly intention has been anticipated by one less so in fact, but to all appearances equally so in will. Another hummingbird rushes in, knocks the one I covet off his perch, and the two go fighting and screaming away at a pace hardly to be followed by the eye. Another time this flying fight was sustained in midair, the belligerents mounting higher and higher, until the one worsted in battle darts away seeking shelter, followed by the victor, who never relinquishes the pursuit till the vanquished, by doubling and hiding, succeeds in making his escape." Not only do they resent the presence of their own kind, but also of other hummingbirds.

Mr. H. W. Henshaw, who was the first scientist to discover that the Rivoli was a member of the bird fauna of the United States, thus describes its nest: "It is composed of mosses nicely woven

into an almost circular cup, the interior possessing a lining of the softest and downiest feathers, while the exterior is elaborately covered with lichens, which are securely bound on by a network of the finest silk from spiders' webs. It was saddled on the horizontal limb of an alder, about twenty feet above the bed of a running mountain stream, in a glen which was overarched and shadowed by several huge spruces, making it one of the most shady and retired nooks that could be imagined."

The note of this bird gem of the pine-

clad mountains is a "twittering sound, louder, not so shrill and uttered more slowly than those of the small hummers."

As the Rivoli hovers over the mescal and gathers from its flowers the numerous insects that infest them; or, as it takes the sweets from the flowers of the boreal honeysuckle, one is reminded of the words of the poet:

"Art thou a bird, a bee, or butterfly?"

"Each and all three—a bird in shape am I,
A bee collecting sweets from bloom to bloom,
A butterfly in brilliancy of plume."

THE SEA-GULL.

From the frozen Pole to the Tropic sea
Thou wingest thy course with the drifting clouds;
O'er ghostly bergs and vessels' shrouds
The beat of thy wings is strong and free.
Alone, or with thy tribe a host
Thou spreadest the bars of the low-ebbed tide.
On the wave-washed drift of wrecks canst ride
Or crowd the cliffs of a rock bound coast.

No home is thine save the ocean's waste;
Unrestrained o'er thousands of miles dost roam;
And follow the trail of the liners' foam
On wings that show no signs of haste.
Thou canst rest on the height of vessels' yards,
Or the gleaming ice of the northern floe.
As the changing tides thou dost come and go
And the shifting wind thy strange course guards.

The seaman well knows the signs thou canst show
Of weather, and luck of the fishing grounds;
And the whaler smiles when the sea abounds
With thy thousands that come as the falling snow.
Yet stranger those thoughts that arise in me,
As I watch thee wheel of thy shining wings,
Of thy life o'er the depths where the ocean flings
From the frozen Pole to the Tropic sea.

—Julian Hinckley.

THE BIRD OF CONSOLATION.

There is a Scandinavian tradition that the swallow hovered over the cross of our Lord crying "Svala! Svala!" (Console, console). Hence comes its name, "svalow"—the bird of consolation.

The habitat of the swallow is the whole of North America and parts of South America. The chief characteristic is usually a deeply forked tail. The swallows of this country are called Bank, Barn, Bridge, Chimney, Cliff, Tree, Land, Purple, Violet, Black, White, Crescent, Green, Blue, Republican, White-billed and White-fronted. There are some twenty common kinds, beside the Swift, which is called a swallow because of certain resemblances. But its structure is different. It has its name from the rapidity of its flight. It is almost always on the wing. Its feet are so seldom used that they are very weak. The chimney swallow has a bristly tail, which assists in its support when the bird alights. Its color is a sooty gray. Of the true swallows none is more familiar than the barn swallow, whose nest adds a picturesque interest to the eaves of the building. This swallow has a steel blue coat, a pale chestnut vest, with a bit of chocolate on chin and throat. The tail is deeply forked. It is not a noisy bird, but has a song—a little trill—aside from the note it uses when flying. Like a merry laugh, it says "Tittle-tittle-ittle-ee." The barn swallow is sympathetic with its mates when they are in trouble and is friendly to man, who sometimes feels like questioning it—

"Is it far to heaven, O Swallow, Swallow!

The heavy-hearted sings;
I watch thy flight—and I long to follow.
The while I wait for wings."

The flight of the swallow is in the curved line, which is that of beauty, and is without effort or restraint.

The cliff swallow, petrochelidon lunifrons—gets part of its name—lunifrons (moon front)—from its white, crescent-like frontlet. It builds a bottle or gourd-shaped nest under the protection of shelving cliffs. A whole colony will sometimes build under the eaves of out-buildings, when the shape of the nest is modified. This bird may be distinguished from the barn swallow by its less forked tail and its blackish color. It is a very useful bird, as it seems tireless in its destruction of injurious insects.

The tree or white-billed swallow wears a bluish-green coat, with white vest. It will sometimes rob the woodpecker of holes in trees in which to build.

The bank swallow or sand martin is the cosmopolitan of birds, as it thrives equally well in Asia, Africa, Europe and America.

Of all the swallows none is a greater favorite than the purple martin. It was doubtless the bird to which Shakespeare alludes when he says, "Where the temple haunting martlet breeds the air is delicate." The purple martin, in iridescent coat, with soft, musical cry of "Peuo-peuo-peuo," is a well protected guest, provided with pretty boxes for homes on tall poles or nailed to the sides of trees. It is a courageous bird, defending its home and young against any ruthless invader.

There is an old true saying that "one swallow does not make a summer." Yet its advent is looked for as the harbinger of warm weather.

"Birds teach us as they come and go
When to sail and when to sow.
Cuckoo calling from the hill,
Swallow skimming by the mill,
Mark the seasons, map the year,
As they show and disappear."

BELLE PAXSON DRURY.

THE WORM-EATING WARBLER.

(*Helmitherus vermivorus*.)

The Worm-eating Warbler is much more retiring and less often noticed than most of the species of warblers. Unlike many of the species its range does not reach to the northern coniferous forests. Passing the winter in the countries bordering the Gulf of Mexico, it migrates in the spring throughout the Eastern United States, breeding as far north as Illinois and Connecticut. Its dull color and retiring and shy disposition eminently fit it for its chosen hunting grounds—the deep and thick woods, bordering ravines, where there is an abundant undergrowth of shrubs. Though preferring such localities, it is occasionally seen in rather open places.

Its companion in the woods is the golden-crowned thrush, for which it might easily be mistaken were it not for the absence of streaks on its breast. Its song closely resembles that of the chipping sparrow and may even mislead the trained field ornithologist. As it deliberately hunts for insects among the dry leaves on the ground or on the lower branches of shrubs, its slow motions are more like those of the vireo than of a warbler.

While walking through woods frequented by this rare little warbler the

experiences of Mr. Leander Keyser is that of all who have had the pleasure of meeting it among the trees. He says: "Suddenly there was a twinkle of wings, a flash of olive-green, a sharp chirp, and then before me, a few rods away, a little bird went hopping about on the ground, picking up dainties from the brown leaves. It was a rare Worm-eating Warbler. The little charmer was quite wary, chirping nervously while I ogled him—for it was a male—and then hopped up into a sapling and finally scurried away out of sight."

It builds its nest on the ground among the dead leaves and under the protecting shade of large leaved herbage or low shrubs. The nest is rather large for the size of the bird. Grasses, small roots, the fibrous shreds of bark and a few dried leaves are used in its construction.

Regarding the habits of this warbler Dr. Cones writes as follows: "It is a sedate, rather a demure, little bird, without the vivacity of most warblers. When startled from the dead leaves on the ground, where it spends most of its time rambling, like the golden-crowned thrush, it flies to a low limb and then often sits motionless or hops listlessly about."

THE HUMMINGBIRD.

A wheel of emerald set to song,
Song of a thousand murmurings;
A rainbow held in its leashes long,
A whirl of color, a rush of wings,
The branches tilt and the petals quake
("There is honey, my love, for you!")
And the frowzled heads of the blossoms shake
After each whispered interview.

Nelly Hart Woodworth.



WORM-EATING WARBLER.
(*Helmitherus vermivorus*.)
About Life-size.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA

NEVA'S BUTTERFLY.

"Oh! Oh! Auntie, please come here, my foot's caught in this hammock and I can't get out and there's a caterpillar going to crawl right on me!" called little Neva Birdsell in an excited tone.

Aunt Doris laid down her sewing and went over to where her little niece was lying with her eyes riveted on a caterpillar which was slowly crawling along quite ignorant that anyone was being alarmed by its presence.

Neva gave a sigh of relief when her aunt picked a leaf from the vine and the caterpillar crawled off on to it.

"Now what shall I do with him?" asked Aunt Doris as the caterpillar curled itself up in a little ball.

"Why, kill it, quick as ever you can," replied Neva promptly, "I don't want horrid old caterpillars crawling 'round me."

Just then a beautiful butterfly lighted on the vine near by and Aunt Doris questioned, "Shall I catch the butterfly and kill that, too?"

"O, auntie, how could you kill a beautiful butterfly?" exclaimed the little girl. "Catch it, though, I'd love to see it close to. But there, now!" she added in a disappointed tone as the butterfly flitted away, "It's gone; they always fly away from me."

Aunt Doris went back to her chair carrying the caterpillar in the leaf with her. She seemed to be studying it for a moment and then asked, "Do you know what I have here, Neva?"

"Why, that caterpillar," answered the little girl in a surprised tone. Then growing curious she left the hammock and went nearer her aunt's chair.

"Yes," said her aunt, "you are right, yet if I should keep it long enough it

would turn into a butterfly just like the one that flew away a moment ago; but I suppose I had better kill it as you wish me to."

"O, please don't," said Neva quickly as her aunt started from her chair, "I didn't know 'bout it's ever being a butterfly. Will it really be like that other one, and could you keep it long enough; and how can you tell what kind of a butterfly it will be?"

Aunt Doris laughed as she said, "Three questions all in one breath. I know it will be that kind of a butterfly because I've studied about butterflies and caterpillars. It has another name beside caterpillar and that is larva. It is a very good name for it means a mask. You know when a thing is masked you can't tell quite what it is by its looks and so you might call this caterpillar a masked butterfly."

"I think it is a good name," said Neva, "'cause I never would guess it was going to be a butterfly; but can we keep it until it isn't masked?"

"Yes, if you will run and ask Nora for a small pasteboard box we will fix a house for it," said her aunt.

Neva ran into the kitchen and soon returned with a shoe-box asking, "Will this do? It's the littlest one there was."

"Yes, that will make a nice, roomy house," replied her aunt, laying the caterpillar gently in the box. Then taking a piece of netting from her work basket she tied it over the top in place of the cover. "Now it will have plenty of light and air," she said. "The next thing will be to get it something to eat."

"What do caterpillars like?" asked Neva.

"Mostly leaves," replied her aunt.

"Well, there is one leaf in the box; won't it eat that?" asked the little girl, watching the caterpillar crawling over it.

"No, dear, caterpillars are very particular about their food; they all eat leaves, but different kinds of caterpillars eat different kinds of leaves. This kind feeds on the leaves of the milk-weed. The butterfly is always very careful to lay the eggs on the plant whose leaves supply the food of the caterpillar so when the little caterpillar comes out of the tiny egg its food is all ready for it."

"Why, Aunt Doris! How can butterflies ever know so much? They don't eat leaves, do they?" asked Neva in a surprised tone.

"No, butterflies eat honey and over-ripe fruit and such things; it is indeed wonderful that they can select the right plant, but the One who made the butterfly gave it wonderful instinct. Who is He, Neva?"

"Our Father," answered the little girl. "I know that we sing in school:

"The little sparrow falleth not
But Jesus taketh heed."

but I never thought of His paying much attention to such a little thing as butterflies. I'm not afraid of this caterpillar now; I just, almost, pretty nearly love it."

Aunt Doris smiled, then setting the box upon the railing she said: "This caterpillar must have taken quite a journey; we will go down the road a ways and see if we can find some milk-weed leaves for it."

Neva ran ahead and her bright eyes soon discovered the leaves. When they had been placed in the box the little girl sat and watched the caterpillar make a good meal, while her aunt explained to her how it would first become a chrysalis and then a butterfly.

"How long does it have to be a caterpillar?" she asked.

"Twenty or thirty days," answered Aunt Doris. "But I think that this one is quite old and will hang itself up before long now."

"How can you tell, auntie?"

"I judge by the color and size. When this caterpillar is very young it is green-

ish, but as it grows older it casts its skin several times; each time it grows brighter and weighs more."

"Why, how can it ever cast off its skin?" questioned Neva in astonishment.

Aunt Doris smiled as she replied: "Wait until it is ready to become a chrysalis and you will see."

Neva kept close watch of her new pet after that, she was so afraid some change might take place that she did not see. When bedtime came her aunt let her take the box up to her room and put it on the dresser that she might look at it the first thing in the morning.

"Why can't we have a name for this creature?" Neva asked while she was getting ready for bed. "I mean a real name spelled with a capital, like mine?"

"When it gets to be a butterfly it will have a name," replied her aunt.

"What will it be?" asked Neva.

"Danais," replied Aunt Doris.

"Danais," repeated Neva, "That's a pretty name, let's call it that now. There isn't any last name to it, is there?"

"Why, yes, there is another name," said her aunt, "but it is a pretty long one. It is Archippus, Danais Archippus; can you remember that?"

"Oh, yes," said Neva, "I'll say it over lots of times and then I'll never forget it," and when Aunt Doris went past the door a little later she heard a very sleepy voice saying "Danais Archippus, Danais Archippus, Archippus."

The next two days the caterpillar crawled around in the box and ate or slept and although Neva looked at it anxiously many times she could see no change and she was beginning to feel a little impatient. Early the third morning she was awakened by a robin which was singing in a tree near her window. Almost before she had her eyes open she jumped out of bed and ran over to look in the box. A moment later Aunt Doris heard a mournful little voice saying: "Danais Archippus, I just believe you're a goner."

"Good morning, little girl, you are an early bird; is there trouble in the box?" she said going over to the dresser.

"There don't seem to be anything in

the box," answered Neva in a sorrowful tone.

Aunt Doris gave one look and then she laughed. "Why, Neva, the sandman is still in your eyes, for you are looking at the bottom of the box and here is the caterpillar hung up on the netting by the little hooks in the tail. It is well that you wakened so early, for half an hour later our Danaïs Archippus would have been a chrysalis and you never could have seen it cast its skin."

Then putting a soft shawl around the little girl she took her in her lap and let her hold the box.

Very soon the caterpillar commenced rolling off its skin, but although Neva watched every minute and almost held her breath, she could scarcely tell how a little, green case, which looked as though it might be made of wax, was hanging where the caterpillar had hung a few moments before, while the old skin lay shriveled up in the bottom of the box.

"Isn't it beautiful, auntie?" she said. "How can God make so many beautiful things?"

"Yes, it is very beautiful," replied her aunt, "but it will be more so after a little; we will set the box up now and look again after you are dressed."

"You were right, auntie," Neva called a little later. "The green case is a prettier color now and it has a row of such cute little gold knobs near the top. What do you s'pose they are there for?"

"You notice that they are placed just where the chrysalis bulges; they are put there to protect the little sleeper when the wind blows the case against anything. You know a chrysalis is usually suspended from a leaf out of doors, and so it needs some such protection," explained Aunt Doris.

"And now how long will this be just a chrysalis and will it just hang and do nothing?" asked the little girl.

"If you are watching it closely you will see that it sometimes swings towards the light and sometimes away from the light just as its needs require. It is a sensitive little mummy. But my little Neva will have to be very patient for it may be twelve or even sixteen days before the butterfly appears."

"It's good I'm making you a long visit," said Neva, "'cause I wouldn't like to go home before the butterfly came."

After ten days had passed the chrysalis began to look a little darker and the twelfth day Neva said, "Auntie, I b'lieve I see something that looks like a wing inside of this little case."

"Sure, enough," said Aunt Doris. "That means that Danaïs Archippus will soon come out of the little green house." Almost before she had finished speaking the case began to move and then the part that was over the butterfly's back burst and a crumpled little object dropped to the bottom of the box.

"Oh, what mussed up wings!" exclaimed Neva in an excited whisper, but already the butterfly had commenced distending them and soon they looked three times the size and were all smoothed out.

"Now will he fly?" asked Neva.

"No, the wings are still drooping a little because they are moist; he will move them back and forth after a little, but will not fly until they are perfectly dry."

"Isn't he just a beauty! How I wish mamma could see how he looks," said the little girl in a longing tone.

"How would you like to have auntie paint his picture before he is ready to fly away?" asked her aunt.

Neva's eyes sparkled. "Oh, will you?" she exclaimed. "I'll run and get your paints."

A few minutes later the Danaïs was taken from the box and placed on the tablespread and Aunt Doris' brush was doing rapid work.

Neva was fascinated as her eyes traveled from her live butterfly to the beautiful deep orange wings trimmed with black and white which her aunt was painting.

"Why Aunt Doris," she said, "It's a zact match, it's 'most a reg'lar twin. How large it is!"

"Yes, it is four and a half inches across the wings. It is the largest kind of an American butterfly."

By the time the painting was finished the butterfly commenced flitting about the room. It soon found its way to the

screen door and Neva said, "It looks just as if it was coaxing to go out."

"Yes, butterflies don't like to be shut up in the house," said Aunt Doris, "and I think a certain little girl must want to play out too by this time, so I'll open the door and watch you both fly."

A few minutes later a happy little voice called from the lawn, "Oh, just look, auntie, Danais Archippus seems to be kissing all the flowers, he's so glad to see them."

When Neva went back to the city she

took the picture of the Danais which her aunt had framed in a pretty gold frame, and also a great bunch of milkweed pods. She looked at them very proudly as her aunt put them in her trunk and said, "They will be such beautiful reminderments of my precious Danais Archippus, though of course I would remember him forever even if I didn't have them, wouldn't I, auntie?" and Aunt Doris looked into the earnest little face and smiled and felt sure that she would.

GRACE T. THOMPSON.

THE INDIGNANT TURKEY.

A TRUE STORY.

Near the pretty town of Madison, N. J., a turkey hen was at one time sitting on her nest of eggs. She knew that she must forego many a pleasant excursion about the poultry yard and through the meadows, where she and her mate had often picked up a sweet wormy meal. As the days grew into weeks Mr. Turkey Gobbler seemed to realize it, too, and decided to put up with widowhood no longer. So he visited a neighboring farm and enticed a good-natured lady turkey to return with him to his home. The patient, lawful wife, hatching her eggs, could do nothing about it. Her place was on the nest, and although doubtless her breast was ruffled with waves of

jealousy, she had no means of avenging herself. But the day of retributive justice was surely and swiftly approaching. Hearing a great commotion in the barnyard one morning soon after the new turkey had been introduced to the fowls, the householder hurried out to investigate. There he found a strange turkey cock thrashing with all his might of claw, wing and beak the robber of his nest and affections, after which he proudly walked off with his mate, leaving the defeated and disloyal bird to make peace as best he could with her of whom he was not worthy.

FANNY SKELTON BISSELL.

LIBRARY
UNIVERSITY OF ILLINOIS
URBANA



THE CHIPPING SPARROW.

(*Spizella socialis*.)

The Chipping Sparrow visits the temperate regions of Eastern North America at that time of the year of which the poet Tennyson has said:

"Now fades the last long streak of snow,
Now bourgeons every maze of quick
About the flowering squares, and thick
By ashen routes the violets blow."

With the advancing seasons it passes still farther northward, till at last some of these birds have established their homes in Newfoundland and Southern Canada. They nest and rear their young from the Gulf States to the northern limits of their range.

Mr. Chapman has truthfully said: "The Chippy is among sparrows what the phoebe is among flycatchers—the humblest, most unassuming member of its family. Both show trustfulness, which, in spite of their unattractive appearance and far from pleasing voices, win our affection."

Few of our feathered friends are more confiding or will show more confidence in us, especially when by quiet, kindly acts we attract them to our doorsteps. They love the habitations of man and will select the vines and bushes of the doorway in which to build their homes. The name Social Sparrow is fully as appropriate as Chipping Sparrow. The latter name is derived from their song, which is best described as a "monotonous chippy-chippy-chippy-chippy," ending at times in a quiet trill. Their happy dispositions and busy lives are inspiring:

"Bid the little homely sparrows,
Chirping in the cold and rain,
Their impatient, sweet complaining,
Sing out from their hearts again;
Bid them set themselves to mating,
Cooing love in softest words,
Crowd their nests, all cold and empty,
Full of little callow birds."

The song of the Chippy lasts about four seconds and is repeated at frequent intervals throughout the day. They "frequently repeat their trills in the darkness of night when restless or disturbed." Mr. Silloway has estimated that "if their total practice through the day amounts

to five hours, it is probable that they utter more than two thousand songs in a day, and perhaps even more; a wonderful record for these little musicians." The ground, the fence, the porch or a shrub serve alike as a rostrum from which, with uplifted heads, to utter their trills.

Were it not for the English sparrow the yards of our country residences would be alive with these companionable birds. They not only enjoy the society of man, but also the presence of their own kind. The male is very attentive and will share food that he has obtained with his mate, for whom he shows the greatest fondness. In fact, the love for each other exhibited by a pair of these sparrows is remarkable. Then, too, their attachment for the home bush, in which they have passed a happy season, is frequently shown by their returning to the same bush or one near by, not only the next season, but probably for several.

The delicate little home of the Chippy is sometimes a neatly and closely woven fabrication of the hairs of horses and cows. Because of this habit of using hair in its nest the Chippy is frequently called the Hairbird. More often, however, the hair is used in the lining, which is protected by an outer wall made of grasses, fine roots and twigs. The nest is seldom placed less than five feet from the ground. In this home, with its feltlike lining, are laid the four or five bluish green eggs, the larger ends of which are speckled with brown or black. The Chippy is not contented with a single family and usually raises two in a season.

The patient devotion of the parent birds to their young is very interesting. They teach the little birds to gather their own food and carefully guard them till they have gained sufficient strength and confidence to care for themselves. Even then parents and offspring remain near each other, lovingly feeding in the same pasture, till the cold autumn drives them to their summer home in the Southern States and Mexico.

CHRISTMAS IN BUNNYVILLE.

It was Christmas Eve in Bunnyville. Bunnyville was in a lovely great forest, and was the place where all the rabbits lived. Mr. and Mrs. Hare and six baby hares lived in a nice hollow tree, by the side of a clear stream of water, so that they never suffered for a cool drink or a bath. The little Hares were very much excited tonight, and were staying up far beyond the usual time, because they had so much to talk about, and were wondering what the morrow would bring. Now, this was to be the first time in their little lives that these dear little rabbits had ever hung up their stockings, for their papa and mamma had not known until recently that there was such a thing as Santa Claus.

Mamma Hare saw that her little soft, wooly babies were getting too much excited, so she said to them, "Now, children, you really must go to bed, or the Santa rabbit will not come to you at all, and then how will you feel? Come! Hurry, now."

So they all scampered toward the mamma and gave her a good hug, with their little furry arms, and jumped into bed, all six of them in a row. The mamma leaned over them, and tucked them all in snugly, pulling the long gray moss up close around their necks, for the night was bitter cold, and the wind was howling fiercely around their tree home. Then she kissed each one, but her way of doing this was to rub her nose against each one of the little wrinkled noses, and that was a rabbit kiss.

They were soon sound asleep, and Mr. and Mrs. Hare were just dozing off, too, when they heard a queer, scratching sound, outside of their big tree, and they lay there peeping out from the moss with their bright eyes until suddenly, through the hole in the tree, there stepped—old Santa. He was a big—a very big—white rabbit, with long ears, and pink eyes, and long whiskers. He had such a kind face

that they were almost tempted to speak to him, but they were afraid if they did he might get scared, and run away, before filling the stockings. Those were the funniest stockings you ever saw. Of course, the little rabbits did not wear stockings, only when it was very cold, they sometimes put on extra fur shoes to play in the snow. So the mamma had made each one a nice, large one, to hang up, and there they hung in a row, on some pegs driven to the inside of the tree. Old Santa looked around a minute, and soon spied these queer fur stockings; but he was used to that, for all the little bunnies he had visited that night had that same kind, so, with a low chuckle to himself, he took a big fur bag off his shoulders and reaching down into it he drew forth the loveliest things papa and mamma rabbit had ever seen. Their eyes fairly sparkled, as they thought of how delighted their babies would be when they awoke. Santa Claus did not forget anybody—not even papa and mamma, for they saw him stuffing a lot of things down at the foot of their bed, as he laughed to think of their surprise. When he left they jumped out of bed, and peeked through the tree, and saw him leap into a sleigh which was made out of a big, big pumpkin and drawn by tiny white mice. Their little silver bells tinkled as they flew over the snow—for the whole world outside was now covered with a beautiful sparkling robe of snow. The rabbits were awake long before the dawn next morning, and made such a noise, giggling and whispering, under their cover of moss, that the mamma could not sleep. Finally they said: "O, mamma, can't we get up?"

"Yes, I guess you might as well," she replied, "as you won't go to sleep." So out they scampered, all six of them, tumbling all over each other in their eagerness to see what good old Santa had brought them. O, how delighted they

were, as they ran their little paws down into each fur stocking, and brought forth the most wonderful things, surely, that rabbits ever had.

There were little red apples, and all kinds of nuts, and nice green things to eat, and actually, a doll, made out of cornstalks, and corn-silk for hair. They had never had a doll before, and they hugged them to their little furry breasts with ecstasy. When the children were all through looking at their gifts the papa and mamma looked at the foot of their bed and found the things Santa had brought them. There were bushels of red and yellow apples, bags of wheat, great cabbages and celery, tender lettuce and all the good things so dear to the heart of a rabbit.

Dear, dear! Their mouths fairly watered, as they looked at these things. More than enough to last them all winter, and now they would not have to go out in the cold, bitter weather, searching for something to eat. They could stay in their good warm tree, and have a jolly time together, and eat all the good things they wanted. After breakfast the children all ran out and played snowball and frolicked around at leap-frog and such outdoor sports all morning, which made them so hungry that they felt as if they could eat up the whole lot of winter supplies. After a while mamma called them in, and they joyfully sat down to their Christmas dinner. There was a long table, just filled with good things, and the children all sat on big strong toadstools. My! how hungry they were. But mamma had known they would be, and had provided everything good that a rabbit likes, and actually had some tiny cakes, and little red candies. What a jolly meal that was! Everybody laughing and chewing away at something held tightly between their two little front paws, and wrinkling up their funny brown noses, smelling at all the good things on the table. It was quite late when they finished the merry meal, and

after looking for some time at the things which Santa had brought, papa and mamma said: "Children, we have another surprise for you now."

Another surprise! What could it be? It seemed to them that they already had every surprise in the world, and they could not imagine how anything else could be thought of.

Mamma made each of them put on a very heavy fur coat, and fur shoes, and they all went out, and went skipping over the cold white snow, until at last, through the darkness they caught a glimpse of something sparkling, and bright and beautiful. Bright lights hung everywhere, and in the center of it all was a tree—that was not like any tree they had ever seen before in all their little rabbit lives. It was a rabbit Christmas tree, just covered with beautiful gifts for all, and there all around the tree were dozens and dozens of rabbits many of whom were friends of theirs, and what a jolly crowd it was. Everybody good natured, and all jumping and hopping, as if their lives depended upon it. Pretty soon from out the darkness who should appear but Santa himself? O, what hurrying and scurrying of little furry feet there was, as all the little bunnies tried to get near him. He smiled upon them all as he stepped to the tree and began handing gifts to each and every one of them. And the funniest part of it was, that he knew every one of their names. After the gifts had all been distributed they all joined hands around Santa Claus, and went around in the wildest, merriest dance, that was ever danced by a party of rabbits. So light of feet and so happy were they that they fairly flew over the ground. Then the good old Santa told them good-by till next year, and jumping into his sleigh, vanished from sight. They all went home very tired, but O, so very, very happy to be tucked away again into their soft, warm nests of gray moss.

JESSIE JULIET KNOX.

TOPAZ.

Remarkable clearness and transparency, capacity of taking a high polish and hardness and weight greater than that of quartz. These are the qualities in which Topaz excels as a gem. Numerous other stones of inferior quality masquerade under its name, however, and this fact may account for the decline in popularity which the stone has suffered in recent years. True Topaz is a silicate of alumina, containing hydroxyl and fluorine. Its hardness is 8 in the scale in which quartz is 7. Hence it will scratch the latter mineral and may thus be distinguished from it. It is also remarkably heavy, considering its composition, it being three and one-half times as heavy as water, while quartz is only two and one-half times as heavy. Owing to this unusual specific gravity, experts accustomed to handling gems can frequently pick out the Topaz from a miscellaneous lot of precious stones without removing their wrappings.

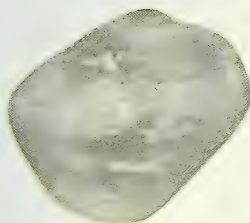
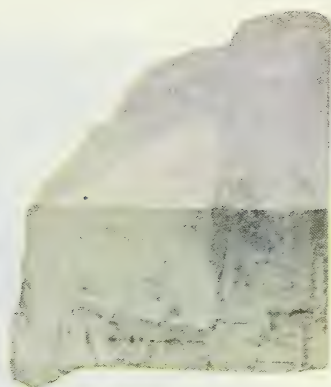
The color typically associated with Topaz in its use as a gem is yellow. Yet the mineral species exhibits many other shades of color, which, when present in crystals of sufficient clearness and purity, answer equally well for gem purposes. These other shades, most of which are represented in the accompanying plate, are grayish, greenish, bluish and reddish. Topaz may also be quite colorless. The yellow color of the Brazilian Topaz can be changed by heating to a pale rose pink and the gem is often treated in this way. The degree of heat employed is not high, and both heating and cooling must be performed gradually. Warming in a sand bath at a low red heat is the method usually employed, or the stone may be wrapped in German tinder and the latter set on fire. Only stones of a brown yellow color yield the pink; the pale yellow stones turn white when so treated. Once the pink color is obtained it is permanent. The natural colors of Topaz are in general perfectly durable, although

some of the deep wine yellow Topazes from Russia fade on exposure to daylight.

Topaz is infusible before the blow-pipe. It is not affected by hydrochloric acid, but is partially decomposed by sulphuric acid and then yields hydrofluoric acid. If the latter experiment is tried in a closed glass tube the formation of the hydrofluoric acid is made evident by the etching and clouding of the walls of the tube. The powdered stone should be mixed with acid sulphate of potash for this experiment. The powdered mineral, when heated with cobalt nitrate, assumes a fine blue color, due to the alumina which it contains. One of the most convenient means of distinguishing Topaz from other stones used to imitate it is through its property of becoming electric by heat, friction or pressure. This electrical condition is evidenced, as in the case of tourmaline, by the power the stone acquires to pick up and hold bits of tissue paper, straws, etc. Sometimes the friction from merely rubbing the stone between the fingers will be sufficient to produce this electrical condition, while many Brazilian Topazes, if simply pressed between the fingers, especially in the direction of the prismatic axis, become electric. The electrical condition often persists from twenty-four to thirty hours.

The crystals of Topaz belong to the orthorhombic system of crystallization. They are usually elongated in the direction of the prism and have sharp, bright faces. They vary much in size and often are large. One crystal weighing twenty-five pounds was found in Siberia.

A well-marked characteristic of all Topaz crystals is their tendency to cleave across the prism parallel with its base. Such a cleavage plane can be seen cutting across the crystal shown in the upper right-hand corner of the accompanying plate. This cleavage is so marked and the cleavage plane so bright and flat



TOPAZ.

COPYRIGHT 1901, BY A. W. MUMFORD, CHICAGO

Topaz with Mica and Feldspar (Russia.)
Topaz (Brazil.)

Topaz in Rhyolite (Utah.)

Topaz (Japan.)
Waterworn Topaz (Brazil.)—Loaned by Foote Mineral Co.

LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO

that in cutting Topaz for a gem a cleavage surface is used as the upper face of the gem and the other faces formed around it. Owing to this easy cleavage the owner of a cut Topaz should be careful not to let the stone drop, as it might be cracked or broken.

The name Topaz is derived from the Greek name *topazios*, which is that of an island in the Red Sea. The gem known to the ancients as topaz, however, was not our Topaz, but the mineral chrysolite. Topaz usually occurs in gneiss or granite, with tourmaline, mica, beryl, etc. In Brazil it occurs in a talcose rock or in mica slate. It is sometimes in sufficient abundance to form an essential rock constituent. When so occurring, however, it has not the transparent gem quality, but is white and opaque. Much of the Brazilian Topaz occurs as rolled pebbles, one of which is shown in the accompanying plate. These occur in the beds of streams, having been left behind owing to their superior hardness after the rock in which they were formed has been washed away. When colorless they are known in the region as "pingos d'Água" (drops of water). The Portuguese call them "slaves' diamonds." A stone in the crown of Portugal, reputed to be a diamond of 1,680 carats weight and called the Braganza, is undoubtedly only a Topaz of exceptional clearness and beauty.

The Brazilian Topazes come mostly from the Province of Minas Geraes, the province which also yields diamonds, beryls and many other precious stones. While those of greenish and bluish shades are found mostly in the form of rolled pebbles the yellow Brazilian Topaz is found in the mother rock. This is a decomposed itacolumite of a white or yellow color. The Russian Topazes, like that shown in the plate, come from the Imperial mines in the Urals. Alabashka, near Mursinka, is one of the most productive localities. The crystals occur in cavities in granite and are accompanied by crystals of smoky quartz, feldspar and mica. Superb gems are cut from these Topazes, a fine series of which is possessed by the Field Columbian Museum. The mines are operated by the Russian Government and the finest spec-

imens are reserved for the Imperial Cabinet.

In the southern Urals, in the gold washings of the River Sanarka, yellow Topazes are found closely resembling those of Brazil. Associated with them are amethysts, rubies, chrysoberyls and many other precious stones. Topaz crystals of good size and color are found quite abundantly in Japan, although they have not yet been cut for gems to any extent. There are many localities in the United States where Topaz occurs, and it is often of gem quality. The group shown in the plate illustrates its occurrence at Thomas Mountain, Utah, a locality forty miles north of Sevier Lake. The crystals are found in cavities in the rock. They are never very large, but are usually clear and bright. They occur in somewhat similar fashion at Nathrop, Colorado. In the Eastern States Topaz was first found at Trumbull, Conn. It is here quite opaque and not suitable for gem purposes. Good gem Topaz has been found at Huntington and Middletown, Conn., however, and especially at Stoneham, Maine. In these localities it occurs in granite.

Of other stones which are sold under the name of Topaz the most common is the so-called Spanish or Saxon topaz. This is simply smoky quartz heated until it turns a yellow color. It can easily be distinguished from true Topaz by the properties above given.

At the present time it is also quite the common practice to vend ordinary colorless quartz under the name of Topaz. These practices are harmful to the reputation of true Topaz, as these forms of quartz are common and cheap and lack many of the desirable qualities of that stone. There is also a so-called Oriental Topaz which is a yellow form of corundum. It is heavier and harder than true Topaz, but its color and luster are not generally considered as desirable as those of that mineral. About forty years ago Topaz was quite popular as a gem and commanded three or four times its present price. At the present not more than two dollars a carat is often paid for the stone.

Topaz is often referred to by ancient writers and is mentioned in the Bible as

one of the stones to be put in the ephod of the high priest; also as one of the gems worn by the King of Tyre and as forming one of the gates of the Holy City. Curiously enough, the gem referred to in these instances was the modern chrysolite, while where chrysolite is spoken of our Topaz is usually meant.

A Topaz presented by Lady Hildergarde, wife of Theodoric, Count of Holland, to a monastery in her native town, emitted at night, according to legend, a light so brilliant that in the chapel where it was kept prayers could be read at night without the aid of a light; a statement which might well be true if the monks knew the prayers by heart.

The spiritual qualities associated with Topaz are fruitfulness and faithfulness.

It is also said to confer cheerfulness upon its wearer. The ancients believed that it calmed the passions and prevented bad dreams; that it discovered poison by becoming obscured when in contact with it; that it quenched the heat of boiling water, and that its powers increased and decreased with the increase and decrease of the moon. Also a Topaz held in the hand of a woman at childbirth was believed to lessen suffering. Lastly, a Topaz is the gem of the month of November:

"Who first comes to this world below
With drear November's fog and snow
Should prize the topaz's amber hue,
Emblem of friends and lovers true."

OLIVER CUMMINGS FARRINGTON.

THE BIRTH OF THE HUMMINGBIRD.

It was born in a valley of violets
Where bird and flower for its favor vied,
Its father a poppy gone stark mad,
Its mother a reckless honey bee,
(True child of such startling pedigree)
Its cradle a sunbeam glorified.

It was bathed in a dewdrop morn by morn
And when the time for the christening came,
The font was filled with a jeweled flame;
Glitter of gems dissolved in mist,
White of diamond, its changing light,
Ruby, emerald, amethyst,
And its christening robe was encrusted quite.

Nelly Hart Woodworth.

THE ROSE TANAGER.

(*Pyrrhula aestiva*.)

"Oh, if it might be that the roses
Be winged, and flying to thee,
Could bear thee a thousand greetings,—
Thou knowing they came from me!

And if song might be given the roses,
When I sped them in token to thee,
They should warble my song to thee softly—
Thou thinking the while on me!"

—From the German of Abingulf Wegener.

The brilliant Rose Tanager,
"Encircled with poetic atmosphere,
As lark emballed by its own crystal song."

might be the fulfillment of the poet's roseate dream, and the message that he bears a vocal incense from the flower's glowing heart.

But if the burden of the one-half of the tanager duet is "my love is like a red, red rose," the other half probably completes the flowery simile, with the proud refrain, "my love is like a green, green leaf," and when the time of the bloom of the rose is past and the rosy plumes, like petals, fall away, he stands revealed an olive calyx, attended as the season wanes by an assemblage of belated olivaceous buds, whose song and carmine tints are folded away to await the summons of the next year's sun.

And when they return to us again in the full flower of their beauty from their southern home, gorgeous as if stained in the dyes of the tropic sun, their song is said to be suffused with color like the mellow tones of the rose-breasted grosbeak and oriole.

This song Nuttall describes as a strong and sonorous whistle like that of the Baltimore bird, "resembling the trill or musical shake on the fife, and is frequently repeated; while that of the female is chattering and is chiefly uttered in alarm when any person approaches the vicinity of the nest. From the similarity of her color to the foliage of the trees, she is rarely seen and is usually mute, while the loquacity and brilliancy of the male, as he flies timidly and wildly through the branches, render him a most distinguished and beautiful object."

Audubon pronounced the usual note of this bird as unmusical, resembling the

sounds "chicky-chucky-chuck," which is not, indeed, suggestive of poetic inspiration on the part of this "poet-prophet of the spring," but the same author states that during the spring he sings pleasantly for nearly half an hour in succession, and that the song resembles that of the red-eyed vireo, his notes being sweeter and more varied and nearly equal to those of the orchard oriole.

Mr. Ridgway describes the song as somewhat after the style of the robin, but in a firmer tone and more continued, and, as compared with that of the scarlet tanager, with which he is often confounded, it is more vigorous and delivered in a manner less faltering. He describes the note of anxiety as a peculiar "pa-chip-it-tut-tut-tut," very different from the weaker cry of *Pyrrhula rubra*.

Mr. Chapman says the summer tanager may be easily identified, not alone by its color, but by its unique call note, a clearly enunciated "chicky-tucky-tuck." Its song bears a general resemblance to that of the scarlet, but to some ears is much sweeter, better sustained and more musical. According to some authorities it equals the robin's in strength, but is uttered more hurriedly, is more "wiry" and much more continued.

Of the bird of Eastern North America Mr. Maynard says: "When the cold north winds cease to blow and the air in the piny woods is redolent with the perfume of the sundew, creeping mimosa and other delicate plants, which only bloom late in the spring, the voices of the summer tanagers are heard in the tops of the highest trees, when their songs are full of wild melody in perfect keeping with their surroundings. * * * So closely do they conceal themselves in the

thick foliage that were it not for the loud song notes, which are constantly repeated, it would be difficult to discover them."

From one of its habits the Rose Tanager is known to farmers as the red bee bird, and, although a bird of day, its taste for nocturnal beetles often leads it to the pursuit of its prey until the shades of evening have darkened into night, when, with the light of its plumes extinguished, as it were, with the setting sun, it proceeds silently and invisibly upon its gustatorial mission.

But it is credible that it is only when

he is in his colorless nocturnal disguise that the prosaic beetle is permitted to refresh this Avian bloom, and that when the god of day has transformed the voiceless shade of night into the winged and musical rose of ornithology for his life's sustenance, the same moment witnesses the miracle of the "dewdrops the sunrise has reddened to wine," and that to his inspiration is poured Aurora's rosy libation, the enchanted

"Wine that Morning spills
Upon the heaven-kissing hills."

JULIETTE A. OWEN.

THE ERMINE.

The Ermine is an aristocratic branch of the weasel family. His coat of pure or creamy white is the envy of kings, nobles and judges, whose robes of state or office etiquette prescribes shall be lined or faced with this matchless fur. A narrow band of the same is turned up around the crimson velvet cap worn beneath the British monarch's crown and the coronets of peers.

At the coronation of King Edward and Queen Alexandra, which is to succeed the period of mourning for the late queen, the royal regalia will be brought into requisition, and in all its magnificent makeup not the least feature will be the priceless ermine trimming, costing the life of many a luckless animal. In view, therefore, of his constant exposure to martyrdom the price the Ermine pays for his social distinction is dear enough and should excite in his humbler cousins, even were they disposed to be sensitive on the point of birth, more of pity than of jealousy.

He dresses in perfection, however, only in winter, and that of the coldest regions, where the exceeding whiteness of his covering serves the two-fold purpose of retaining heat and concealing his presence on the universal carpet of snow, both from the enemies seeking his life and from the prey on which he subsists.

For a summer outing suit nature provides him an unconventional dress of light reddish brown varied with a stom-

acher of tawny white. With the doffing of his regal attire he also lays aside the distinguished title of Ermine and becomes plain Mr. Stoat.

This species of the weasel is found throughout Great Britain and in most parts of continental Europe, but except in northern Scotland, Scandinavia, and Russia the winters are neither sufficiently long nor cold to produce a complete change of color and he is left with a funny piebald coat which no one covets. The skins that supply the markets of the world all come from the arctic countries of the three northern continents, Europe, Asia and North America. A permanent feature of the Ermine's coat is the glossy black tail tip, which in the preparation of the fur is inserted at regular intervals on the white, where the sharp contrast gives a most pleasing effect.

An utter abhorrence of uncleanness is a characteristic instinct of his lordship, and impels him to suffer capture or death rather than become soiled or bedraggled. This sentiment of purity is figuratively transferred to the fur whose use on the garments of rulers and judges symbolizes the purity of justice and law.

Determination and perseverance are qualities displayed in the pursuit of game for food, consisting of small herbivorous animals, birds, and eggs. In length the Ermine's body is about ten inches; the tail, four inches; the legs are short, bearing the slender body with a creeping snake-like motion. M. A. HOYT.

LIBRARY
UNIVERSITY OF ILLINOIS •
CHICAGO



THE RHESUS MONKEY.

(*Macacus rhesus.*)

It was in Simla that we first encountered the Rhesus Monkey. We had gone up to Simla to escape the intense heat of Bombay, and, refreshed by the cool air of the "hill country," we were soon ready to make the expedition to the hill called Jako. This hill is indeed the hill of the monkeys. It is eight or nine thousand feet above the level of the sea, and here lives a fakir, who feeds the monkeys as they troop down the mountainside at his call.

Undoubtedly there is no more mischievous monkey than the Rhesus, but, after all, he is not altogether to blame, for the blame may belong to the Hindoos. Some tell us that the Rhesus Monkey is sacred; others think not. But, however that may be, it is a fact that the Hindoos protect the monkeys in every possible way, willingly sharing their food with the bands which are found almost everywhere, and permitting no one to kill them.

This fosters every mischievous trait in these monkeys, and they fear nothing from man. They will devastate every plantation and garden near them. They belong to that genus of the ape family called Macaque, and as this variety, with their near relations, the other macaques, are found all over Southeastern Asia, besides one branch in Western Africa, one can readily see that their mischievousness becomes a serious drawback.

The natives of Baka are said to leave one-tenth of their harvests in heaps for the monkeys, which come down in great numbers and carry away all that is left for them. And this they can readily do on account of their well-developed cheek pouches. These pockets in the cheeks are assuredly most convenient, but are never found on American monkeys. The Old World monkeys are the narrow-nosed variety, while the American monkeys have the broad nose bone.

Our Rhesus Monkeys had, of course,

the narrow nose bone. They averaged about twenty inches long, and the tail was half as long. Like all the macaque monkeys, they were of sturdy build, with legs of moderate length. In color the fur was grayish or greenish on the upper part, yellowish over the hips and white below. The tail was greenish above and gray under. The face, ears and hands were of a light copper color.

The mother monkeys were most assiduous in the care of their young, but in educating them one of the most important lessons was to teach them to steal successfully. This the pupils learned with ease, and to find a Rhesus Monkey which could not steal would be a curiosity indeed.

While in Simla we were told the oft-repeated story of Lady Barker's dinner. Lady Barker, desiring to give a dinner to a large number of guests, took unusual pains in the preparation of the feast. With her own hands she arranged the flowers, and in the most attractive manner were placed upon the table all the delicacies possible to procure, far and near. When everything was arranged to her entire satisfaction, she retired to array herself for the reception of her guests. The servants were left in charge of the rooms, but instead of watching the tables, they deserted their posts to amuse themselves in a more congenial way. Imagine the surprise and consternation when, upon descending to the dining room, she found it filled with guests, but not those whom she had invited. A large band of monkeys had entered through the windows and were enjoying themselves without restraint. Poor Lady Barker had nothing left to offer her invited guests but the spoiled remains of her sumptuous feast. Her little lap-dog "Fury" met with an untimely death by the hands of probably this same band of monkeys. The dog waged war on the creatures at every opportunity, but one day a large

monkey managed to catch him and carry him along to its tree-top. There the dog was tormented by all the monkeys, being passed from hand to hand and finally thrown down a precipice.

While the Rhesus is an intelligent creature and easily taught while young, it is a question whether one really wishes this monkey for a pet, for when old, they become vicious and spiteful and can bite and scratch in a dangerous manner.

In addition to the fruit and seeds which they eat, they are also fond of insects and spiders, and frequently large parties may be seen searching the ground for these delicacies.

Professor Ball relates an interesting anecdote of these monkeys. He said that when at Malwa Tal, a lake where he spent a day, he was warned that when passing under a certain landslip which slopes to the lake, he would be liable to have stones thrown at him by the monkeys. As he thought this might be only a

traveler's tale, he took pains to go to the spot in order to see what had given rise to the story. As he approached the base of the landslip, he saw a number of Rhesus monkeys rush to the sides and across the top, and presently pieces of loosened stone and shale came tumbling down where he stood. He soon satisfied himself that this was not accidental, for he distinctly saw one monkey, industriously with both forepaws, push the loose shingle off a shoulder of rock. He then tried the effect of throwing stones at them, but this made them quite angry and the amount of fragments which they set rolling was speedily doubled. This adventure caused Professor Ball to believe that there may be some truth in the stories related in regard to monkeys throwing fruit at people from the tree tops, and yet even about monkeys it is not always best to credit all one hears.

JOHN AINSLIE.

AN ANIMAL TORPEDO.

The gymnotus, or electric eel, is a common denizen of the stagnant pools and sluggish lagoons of the Llanos of Venezuela. It is known to the natives under the more suggestive name of *arimna* or something that deprives of motion.

Our first experience with this curious Animal Torpedo was on the borders of the Llanos, a few days' journey to the south of Valencia. The pack mules, usually very slow, had preceded us, during the noon hour, while we had leisurely taken luncheon. In the course of an hour, we caught up with them, as they had reached a sluggish estuary of a neighboring river. Before we were in hailing distance, we could see, from the wild and frantic gesticulations of the muleteer,

that something unusual had occurred. It proved to be an attack of electric eels upon the first mule, which had attempted to ford the lagoon. The animal had nearly reached the opposite shore before the attack was made, and thus, the first mule had escaped with only a few shocks from the invisible torpedoes. The other pack mules, just entering the stream, were turned upon savagely by the concealed serpents, and were wildly and frantically turning back, when we came upon the scene. Their distended nostrils and bulging, terrified eyes, with excited snorting and plunging, would have made a perfect picture of agonized terror. Their suffering, fortunately, was of short duration, as they soon gained the

shore and dashed away madly over the prairie. The first mule, which had crossed, terrified by the electric shocks received, had retreated from the lagoon and, in a state of great fright, had plunged into a browsing herd of cattle, dangling its swaying pack and causing a frightened stampede among the half-wild herd. The latter, ignorant of the immediate peril, rushed toward the lagoon ford, and, if those in front hesitated, they were persistently prodded by those from behind. In a moment all were in the midst of their dreaded enemies in the water. A scene followed which is hard to describe. The poor brutes reared, bellowed and moaned; they gored each other in their agony, while their startled eyes seemed ready to jump from their sockets.

As the herd was numerous, the greater portion soon struggled out, and, with tails reared high in the air, they plunged, like maddened demons, across the prairie. Three cows and a heifer remained in the pool with the eels. The former, much exhausted, finally escaped from their tormentors, but the heifer, unable to withstand the repeated attacks, made one last effort, and, with a gasp, sank below the surface.

We spent some time in collecting our terrified pack mules and scattered baggage, finally crossing the bayou at a shallow point some distance above the ford. In the meantime, one of the mozos speared one of the eels, as they had become very sluggish and were swimming aimlessly about the surface, after having spent so much of their galvanic force. The captured specimen was about two and a half feet in length and would weigh about eight pounds. It had an olive green color and the upper part of the head was mingled with red. Two rows of yellow spots are placed symmetrically along the back, each spot contain-

ing an excretory aperture, which were its galvanic batteries. It possessed an enormous swimming bladder, which accounts for its great agility and swiftness in the water. The creature looks more like a fish than an eel, and is very difficult to capture in nets, owing to its agility and a habit of burying itself in the mud when frightened. The electric action of the eel depends entirely upon its own will and a shock can be given whether it is touched by one or both hands to complete the circuit. When wounded, their power is almost destroyed and they are able to give only feeble shocks. Humboldt describes putting both feet upon a newly-captured specimen, which rendered him entirely powerless for a considerable time. The shock was so great that he suffered all day from pains in his knee and back.

Though caught easily with a harpoon, the natives have such an intense dread of them that it is difficult for naturalists to secure specimens. The peons have an idea that one can escape the shock, while going through waters infested by the eels, if he carries a chew of tobacco in his mouth. This supposed influence of tobacco upon animal electricity is not entirely without some scientific basis, but in the form of a quid in the mouth it is, of course, purely imagination.

It is not an uncommon thing for a large colony of these eels, to attack and drown a horse in mid-stream, which they will leisurely devour afterwards. It is recorded that, during the patriot wars in Venezuela, a large army marching through the Llanos was seriously disabled in crossing a bayou infested with these mischievous creatures. At Damarara, British Guiana, in the early days, these eels were employed by the medical fraternity, to cure paralytic troubles, just as the torpedo fish was employed by the ancient Greeks.

ANDREW JAMES MILLER.

THE CAMEL.

We were on the road to Biskra, the "Queen of the Desert." Sand, sand everywhere, as we looked across the dreary spaces as far as the eye could reach. Frequently the monotony was relieved by the long lines of caravans passing to and fro; they were picturesque and poetical; they moved with stately motion and graceful swing across the background of never-ending and often shifting sand.

Had this been our only experience with the Camels which compose the caravans, we would have returned with glowing accounts and waxed eloquent over these beasts of burden. We would have assured our friends of their patience and fortitude and with growing enthusiasm described the showy trappings and effective poses which charmed us on the desert road. But alas! We came to know the Camel well at close range and truly "familiarity breeds contempt."

The Camels about Biskra were the long-legged variety commonly called Dromedaries. They had but one hump and averaged from about six and one-half to seven and one-half feet in height; and from muzzle to tip of tail they measured ten or eleven feet. While the majority were of a light sandy color, it was not impossible to find a white, grey, brown or even black Camel, but a black Camel was held in great contempt by the Arabs. The hair was irregular in length and almost woolly in places. The callouses, large and prominent, were found on the breast and joints of the legs, making cushions for the beast to rest upon when lying down or kneeling. These callous places, scarcely showing at birth, grow with advancing age.

It is true that these animals, ungainly and uncouth at near view, are indispensable to the Arab of the desert; but all

their generations of domestic life have failed to cultivate in their stupid minds any affection or care for their masters. Their obedience is passive and their apparent patience only stupidity, for they are unamiable, obstinate and disagreeable.

The Camel varies nearly as much as do the horses of our own country. There are many grades and degrees from the ordinary baggage Camel to the high-toned thoroughbred which corresponds to our high-class race horse. These racing Camels are long-legged and long-necked, the hump stands upright; is conical in shape and covers about one-fourth of the length of the body; the head is rather short, the eyes large and dull, and the ears very small but mobile. The hair is especially fine and soft.

A friend of ours who owned a fine saddle Camel was able to make from eighty to ninety miles a day if his Camel was well fed and watered and was allowed a rest at noon. This pace he was able to continue without injury for three or four consecutive days, and after a well earned rest he could repeat the journey.

A baggage Camel, carrying a load of perhaps three hundred pounds, would not make over thirty miles a day, but could often march twelve hours or longer without rest. However, a man of position would never condescend to ride on a baggage Camel.

Our friend told us that in buying saddle Camels for our desert ride we would be obliged to pay about sixty-five dollars each, and that we must look for those with soft backs, those which did not require the whip and would not cry when getting up or lying down. But he added that with these excellent traits we must not expect too much, for the best Camel



ASIATIC OR BACTRIAN CAMEL.
(*Camelus bactrianus*).

COPYRIGHT 1901, BY A. W. KUPFER, CHICAGO.

LIBRARY
UNIVERSITY OF ILLINOIS
CHICAGO

was capable of every fault associated with a vicious disposition. And, indeed, when, some days later, our favorite Camel, when passing an Arab riding a donkey, turned his head suddenly and gave the man's arm a vicious bite, we were well satisfied that our friend's estimate of the Camel's disposition was absolutely correct. The wound inflicted by our animal was very severe, as the bite of a Camel usually is. We sought our friend's aid in adjusting the matter and he related some of his experiences with this ungrateful animal.

At one time he was the owner of a Camel to which he had always been especially kind. He started on a journey across the desert, and after annoying him in every possible way with a continued persistence surprising in so stupid a beast, the Camel, in a fit of rage, broke into a gallop, throwing the gentleman from his saddle to the ground, trampled upon him and then galloped away at its own sweet will. We were also told that when the natives found that their Camels had a grudge against them, they so feared the revengeful beasts that they would place their clothing before the Camel and hide themselves behind bushes. The animal would then expend its rage upon the clothing, trampling and tearing it; the injury, real or imagined, would then be forgotten.

As it is about impossible to retain one's seat on a galloping Camel, they are trained only to trot. "The steady, alternating movement of the legs on the opposite side of the animal stops the sideways jolting motion, and if the rider skillfully lies back in his saddle, he experiences no more inconvenience from the still somewhat violent shaking up than he would if he were on horseback."

After purchasing our Camels, we began to study the habits and needs of our new acquisitions. We found ourselves obliged to provide food of a kind that caused us some surprise. Our Camels were far from fastidious. In fact, the poorer the food, the better it seemed to suit the needs of these peculiar beasts for the dryest of vegetation was acceptable. Shrubs and thorny branches were rapidly disposed of and one wondered that even

their callous mouths could take them without injury. They were also fond of small beans, peas and vetches and were not averse to making a juicy meal on cultivated fields. But this indulgence was to be avoided, as it was liable to produce inflammation and death.

The idea that Camels when working could go very long periods without food and water, we found to be erroneous. The true ruminant has four stomachs; the Camel has three divisions only. The first two divisions are provided with cells or pouches which can be closed by strong muscles. These contain fluid only and it is on account of this peculiar construction that the animal can go several days without water, but when traveling in the heat of an African desert, at least every four days, the Camel must have water, nourishment and rest.

On account of their acute smell, they will detect water at some distance and it is really an interesting sight when thirsty, tired-out Camels draw near to a well or river. They lift their heads high in the air, inhale long breaths with half-closed eyes, lay their ears back and then start to run, so that one has to sit firmly in the saddle if he does not wish to be thrown out. When the beasts finally reach the well they crowd to the water and give themselves up to the enjoyment of drinking.

The food supply which assists the Camel in times of fasting is stored in the hump, which is really one great lump of fat. In times of plenty this is firm and pyramid-like in form, and may weigh as much as thirty pounds, but after prolonged hunger it will nearly disappear; weighing perhaps only four to six pounds.

This provision of nature, added to its peculiar stomach, makes the Camel in many respects the most useful of domestic animals. It has been domesticated from very early times. We know that they were owned in great numbers four thousand years ago. Pharaoh gave them as a present to Abraham and the patriarch Job had at one time a herd numbering six thousand.

A baby Camel is a misshapen little thing, but like all young animals it is playful and interesting. It is about three

feet high when it enters the world, but in a week's time is much larger. It is able to follow its mother soon after birth. She will defend her own to the extent of her strength if needful.

The Camel is a true animal of the desert and only thrives in hot, dry localities. It is of little use in a mountainous country, as it is a poor climber and cannot remain in health when fed on luxuriant vegetation.

In the water it is of still less use. Perhaps because the desert is its "native heath," it holds an antipathy for water and either cannot or will not swim, so the crossing of a stream with a caravan becomes a serious undertaking. Sir Samuel Baker recounts his experience in crossing the Athara river (about three hundred yards wide. "Water-skins were inflated and passed under the belly of the Camel like a girth. A man sat upon its back while one or two swam by its side as guides. As the current of the river was rapid, the animal was usually half a mile down stream before gaining the opposite bank."

Some time after we became acquainted

with the one-humped Camel (the Dromedary) of Africa, our journeyings took us to the regions of Central Asia and there we met for the first time the Bactrian or two-humped Camel. This varies somewhat from the Dromedary as it has a larger body, shorter legs, longer and thicker hair and is able to live in a cooler climate and at a greater elevation. Although stupid in intellect, like the Dromedary, we must give it the credit of having a much better disposition. It is of the greatest use to its owners. Its hair, milk, skin and flesh are all put to use. It is not only used as a pack animal, but is harnessed to carts as well. Put to use when five years old, it will, with good treatment, continue to work until its twenty-fifth year. With its help, its owner is able to climb mountains thirteen thousand feet high, and to cross treeless wildernesses where horses would soon perish. It could not be replaced by any other domestic animal. "The horse is the companion of the inhabitant of the steppes," but the Bactrian Camel, the "Ship of Asia," is his faithful servant.

JOHN AINSLIE.

THE HILL SUMMIT.

This feast-day of the sun, his altar there
In the broad west has blazed for vesper-song;
And I have loitered in the vale too long
And gaze now a belated worshipper.
Yet may I not forget that I was 'ware,
So journeying, of his face at intervals
Transfigured where the fringed horizon falls,—
A fiery bush with coruscating hair.

And now that I have climbed and won this height,
I must tread downward through the sloping shade
And travel the bewildered tracks till night.
Yet for this hour I still may here be stayed
And see the gold air and the silver fade
And the last bird fly into the last light.

Dante Gabriel Rossetti.

UNIVERSITY OF ILLINOIS
URBANA

THE ZEBRA.

When passing through the zoological garden one summer afternoon, my attention was called to the antics of the fun-loving, shy and graceful Zebra which was delighting the children with his original performance. There was no ring-master to indicate the various evolutions, but Zebra Joe was furnishing a sort of circus all by himself. He seemed to have forgotten that he was a stranger in a strange land, and could he have been transported to his own country in South Africa, I hardly imagine he would have seemed gayer or more free.

The Zebra is of all things a freedom-loving animal. He will go like the wind and, if pursued singly, cannot be caught. It is true that large herds are overtaken, as they impede each other's progress, but it is a shame that these beautiful creatures should be hunted at all. The European will try to kill them with bullets, the natives with javelins, but more frequently these dainty animals are caught in pitfalls and then captured or slain according to the will of the pursuer.

They live gregariously and are found in groups of from ten to twenty, though there are accounts of large herds. Probably these were migrating. When running, they usually go in single file, the stallions leading. They are not very fastidious in regard to their food, but if the supply fails in one place they seek another locality. The Zebra defends itself from other animals by biting and kicking, and the lion is about the only foe which can overcome it.

Of the three species, the mountain Zebra or true Zebra lives farthest south. It ranges over the mountainous country of Cape Colony. It is the smallest of the three varieties, and is distinguished from the others, not only by the peculiar markings, but by the large ears, short mane and scantily haired tail. It is the only variety where the transverse markings of the legs extend to the hoofs.

It is a very curious fact that the dif-

ferent species of Zebra are never found together. Perhaps they fear each other, but they do not fear other animals, for all agree that in the herds of quagga (which is grouped with the Zebra) are nearly always found spring-boks, gnus, ostriches and also buffalos. Ostriches, especially, are the companions of this species of wild horse, which takes advantage of the vigilance and sagacity of these great birds. Some species of the Zebra follow the horses of traveling parties and graze among them, seeming to have a certain friendship for the one-hoofed domestic animals.

The Burchell's Zebra is the largest and noblest appearing of the species. It is a rover of the plains and does not seek the mountainous districts where the true Zebra is found. It stands about four and one-half feet in height at the shoulders. The general ground color of the hair varies from white to yellowish brown and the stripes are brown or black. The hoofs are more like those of a pony than the other species. It is not found south of the Orange river and it is not known how far north its range extends.

Our illustration shows an example of Chapman's Zebra. This, in reality, is a variety of Burchell's Zebra and should not be considered apart from it.

The third species is called Grévy's Zebra. More slender than the true Zebra, it is somewhat like it in its markings. "Colonel J. A. Grant, who first met these Zebras in the mountains north of Victoria Nyanza, writes that they were found in herds comprising from two to nine individuals." He says that "one of their number, probably the largest male, takes general charge of the herd; and it was noticed that a large antelope kept watch and gave the alarm on our appearance. They are rarely found outside the forest, preferring it to the open plain, which is geneally bare of grass; or they frequent a country with clumps of dense brushwood, or with outcrops of granite, around

which they get abundant food, and they were never seen far from running water or hills."

"They showed much sympathy when a comrade was wounded, lingering with the hurt one at the risk of their lives; they lingered with our laden donkeys one day on the march." These Zebras are sometimes found at an elevation of two or three thousand feet.

There is a variety of opinion in regard to the possibility of taming the Zebra. Undoubtedly many incompetent persons have made the attempt and failed. It is claimed that others have succeeded. There is a record that a couple of beautiful animals in England could be harnessed to a light carriage and used like horses. On the other hand, there is told the story of a rich settler in Cape Colony who had reared several Zebras. He had perfect

confidence in their docility and he thought one day that he would have them harnessed to his carriage. This he did, taking the reins himself. The details of the ride are lost to posterity, but in a very short time the gentleman found himself in their stable together with the remnants of his carriage. This so discouraged his friends and neighbors that they unanimously declared the Zebra to be untamable and they made no further attempt.

"All who have seen Zebras in their native haunts, speak of the beautiful appearance presented by a drove, as they stand for a moment to gaze at the hunter, and then wheel round to seek safety in flight. It has been stated that, when standing on sandy ground in full moonlight, a Zebra harmonizes so exactly with the color of its surroundings as to be quite invisible at a short distance."

JOHN AINSLEE.

ASPIRATION.

Oh, for a soul that fulfils
Music like that of a bird!
Thrilling with rapture the hills,
Heedless if any have heard.

Or, like the flower that blooms
Lone in the midst of the trees,
Filling the world with perfume,
Careless if anyone sees.

Or, like the wandering wind,
Over the meadow that swings,
Bringing wild sweets to mankind,
Knowing not that which it brings.

Oh, for a way to impart
Beauty, no matter how hard!
Like unto nature, whose art
Never once dreams of reward.

—Madison Cawein, in Lippincott's Magazine.

INDEX.

Volume IX — January, 1901, to May, 1901, Inclusive.

	PAGE
Apple, The [Illustration] (Charles S. Raddin)	38
April [Sonnet] (Helen Hunt Jackson).....	145
April [Poem] (Bernard Malcolm Ramsay).....	145
Arbutus, The Trailing [Illustration] (Charles S. Raddin)	228
Arbutus, Trailing [Poem] (George Bancroft Griffith)	231
At Dusk [Poem] (Albert Schneider).....	96
Awakening [Poem] (Margaret E. Sangster)	236
Back-Yard Class, A (Lee McCrae).....	214
Bacteria, The Study of (Adolph Gehrmann).....	6
Bear, The [Illustration].....	122
Beaver, The [Illustration].....	170
Before the Storm [Poem] (Mary Morrison)	119
Bird Calendar by the Poets, A (Arranged by Ella F. Mosby).....	24
Bird Gossip, A Bit of (S. E. McKee)	115
Bird Incidents (Berton Mercer).....	126
Bird-Joke at Leafy Lawn, A (Gertrude Southwick Kingsland).....	202
Bird Notes [Poem] (Mary Hefferan).....	85
Bird, The Autobiography of a (Caroline Crowinshield Bascom).....	17
Bird, The Story (Belle P. Drury).....	121
Birds, The Geographical Distribution of (Lynds Jones)	65
Blackbird or Grackle, The Rusty [Illustration].....	204
Blackbird's Song, The [Poem] (Walter Thornbury).....	151
Black Bugs, The Story of Some (Louise Jamison).....	12
Boy-Chickadee (Elizabeth Nunemacher).....	120
Cinnamon [Illustration] (Albert Schneider).....	95
Crossbill, The Legend of the [Poem] (Henry Wadsworth Longfellow)	5
Crossbill, The White-Winged [Illustration]	2
Cubebs [Illustration] (Albert Schneider).....	191
Curassow, The [Illustration]	146
Dovekie, The [Illustration].....	167
Dowitcher, The [Illustration].....	59
Duck, The Harlequin [Illustration].....	155
Eagle, A Golden (Charles Elmer Jenney)	152
Eagle, The [Poem] (Alfred Tennyson).....	62
Elk or Wapiti, The American [Illustration]	216
February [Sonnet] (Helen Hunt Jackson).....	49
Field Mouse, A Friendly (J. Clyde Hayden).....	219
Fishes and Fish-Culture Among the Greeks and Romans (T. Louis Camparette)	89
Flower Garden, A Night in the (Fanny Wright Dixon).....	36
Flycatcher, The Yellow-Breasted [Poem] (Carrie B. Sanborn).....	8
Frost King's Realm, A Stroll in the (Addie L. Booker).....	73
Frost Work [Poem] (Thomas Bailey Aldrich).....	49
Gila Monster [Illustration] (Amelia Walson).....	80
Godwit, The Marbled [Illustration].....	201
Grackle, The Great-Tailed [Illustration].....	62
Grouse, The Canada [Illustration] (Seth Mindwell).....	158
Hawks, The [Illustration] (Seth Mindwell)	50
Heart of a Dryad, The (Ella F. Mosby)	198
Hops [Illustration] (Albert Schneider).....	235
Instinct, Do Plants Have (Rowland Watts).....	162
Knot or Robin Snipe, The [Illustration]	14

Laurel, The Mountain [Illustration]	232
Lemon, The [Illustration] (Charles S. Raddin)	182
Lizard, The Collared [Illustration]	35
Lower Animals, Some Things We Might Learn from the (Rowland Watts).....	60
March [Poem] (Walter Thornbury)	144
May [Poem] (Walter Thornbury).....	193
Mrs. Jane's Experiment (Mary Noland).....	72
Murrelet, The Marbled [Illustration]	119
Nautilus and Other Cephalopods, The [Illustration] (Frank Collins Baker)	222
Nautilus, The Chambered [Poem] (Oliver Wendell Holmes)	221
Nests, Some Notable (Elizabeth Reed Brownell).....	149
Old Year, The [Poem] (Alfred Tennyson).....	1
Orange, The [Illustration].....	134
Orchard Bird-Way, An (Alberta A. Field).....	156
Oriole, Audubon's [Illustration] (Seth Mindwell)	194
Owl, The American Hawk [Illustration].....	23
Oyster and its Relatives, The [Illustration] (Frank Collins Baker).....	26
Parrots, About [Illustration] (Lawrence Irwell).....	98
Pau-Puk-Keewis and the Beavers [Poem] (Henry Wadsworth Longfellow).....	174
Pelican, The American White [Illustration] (Seth Mindwell).....	110
Pepper [Illustration] (Albert Schneider).....	143
Plants, The Geographical Distribution of the Seed-bearing (John Merle Coulter).....	42
Poem [Selection] (Thomas Bailey Aldrich)	109
Poem [Selection] (Thomas Bailey Aldrich)	107
Poem [Selection] (Robert Browning)	227
Poem [Selection] (Barry Cornwall).....	25
Poem [Selection] (George Gee)	164
Poem [Selection] (George Gee)	167
Poem [Selection] (William M. Hardinge).....	193
Poem [Selection] (Helen Hunt Jackson)	232
Poem [Selection] (John Keats)	41
Poem [Selection] (James Thompson)	59
Poem [Selection] (Walter Thornbury)	175
Polly [A Story about a Moth] (Susan Brown Robbins).....	108
Pomegranate, The [Illustration].....	86
Rabbit's Cream [Poem] (Hattie Whitney).....	37
Sandpiper, The [Poem] (George Bancroft Griffith).....	114
Sandpiper, The Solitary (H. S. Keller).....	13
Scoter, The Surf [Illustration] (Frank M. Woodruff).....	213
Sea-Bird, To a [Poem] (Bret Harte).....	197
Sea-Mews in Winter Time [Poem] (Jean Ingelow).....	127
Snails of the Forest and Field [Illustration] (Frank Collins Baker).....	74
Snails of the Ocean [Illustration] (Frank Collins Baker).....	176
Snails of Pond, River and Brook [Illustration] (Frank Collins Baker).....	128
Snipe, The Knot or Robin [Illustration]	14
Sparrow, The Alaskan [Poem] (Nellie Hart Woodworth).....	56
Sparrow's Appeal, The Song (George Bancroft Griffith).....	168
Spring [Poem] (Henry Wadsworth Longfellow)	97
Stone Houses, Interesting (Rest H. Metcalf).....	55
Summer, The Passing of [Poem] (Benjamin Karr).....	32
Swan, The Musical (Juliette A. Owen).....	137
Tree Top Town, A [Poem] (Austin Arnold McCausland).....	192
Vanilla [Illustration] (Albert Schneider).....	47
Viola Blanda [Poem] (Nelly Hart Woodworth).....	14
Wapiti, The American Elk or [Illustration]	216
Warbler, The Hooded [Illustration].....	71
Warbler, The Townsend's [Illustration].....	11
What Evolution Means (Lawrence Irwell).....	207
When Spring Comes [Poem] (George Gee).....	188
Winter Buds, The Opening of (Roberta Irvine Brotherson)	220
Witch in the Cream, The (Elizabeth Roberts Burton).....	169
Wrens, Two (Nelly Hart Woodworth).....	185

INDEX.

Volume X--June, 1901, to December, 1901, Inclusive.

	PAGE
Ad Vesperam (Poem) (Mary Grant O'Sheridan)	96
Agate (Illustration) (Oliver Cummings Farrington).....	35
Animal Torpedo, An (Andrew Janes Miller).....	226
Aspiration (Sonnet) (Madison Cawein).....	236
Autumn Evening, An (Poem) (Walter Thornbury).....	145
Ballade (Poem) (Angelo Poliziano, 1454-1494)	73
Bear, The Polar (Illustration) (Dane Coolidge)	143
Beryl (Illustration) (Oliver Cummings Farrington)	122
Bird Incident, A (Mary Noland).....	181
Bird Note, A (A Story of a Robin) (Berton Mercer)	72
Bird of Consolation, The (Belle Paxson Drury).....	203
Bird, The Outraged (Fannie Skelton Bissell)	175
Birds, A Libel on the (L. P. Veneen).....	120
Birds, The Return of the (Poem) (William Cullen Bryant).....	7
Buffalo, The American (Illustration)	26
Butterfly, Nova's (Grace T. Thompson).....	207
Camel, The (Illustration) (John Ainslie).....	228
Canoe-Birch, The (Poem) (George Bancroft Griffith)	48
Chat, Mr., The Punchinello (Nell Kimberly McElhone)	31
Christmas in Bunnyville (Jessie Juliet Knox).....	214
Clematis, The Wild (Poem) (Jenny Terrill Ruprecht).....	84
Cocoa (Illustration) (Albert Schneider).....	44
Cormorant, Brandt's (Illustration) (Seth Mindwell)	23
Cornfield, An Afternoon in the (Mary Grant O'Sheridan)	5
Corn Song, The (Poem) (John Greenleaf Whittier).....	104
Dainty Lover, A (A Story of a Bird) (Louise Jamison)	72
Dishrag Vines (Lee McCrae).....	156
Duck, The Autobiography of a (Louise Jamison)	138
Each in its Own Way (Poem) (Selected).....	68
Elephant, The Indian (Illustration) (Dane Coolidge)	83
Ermine, The (M. A. Hoyt).....	222
Evergreens, A Plea for the Young (Poem) (Eliza Woodworth).....	198
Fire-Bird, The (The Baltimore Oriole) (Belle Paxson Drury)	20
Flag, The (Poem) (Ella Van Fossen).....	186
Flower, A Lost (Ella F. Mosby).....	140
Flycatcher, The Olive-sided (Illustration).....	107
Flycatcher, The Yellow-bellied (Illustration).....	98
Giraffe, The (Illustration) (John Ainslie).....	182
Goldenrod (Poem) (John Wesley Waite)	72
Grosbeak, The Pine (Illustration).....	146
Grouse (Belle Paxson Drury).....	181
Gull, The Sea (Poem) (Julian Hinckley).....	202
Hill Summit, The (Poem) (Dante Gabriel Rossetti)	232
House-Hunting in Orchard Town (Poem) (Isabel Goodhue).....	8
Hummers, Experiences with (J. Mayne Baltimore).....	55
Hummingbird, My (Poem) (Willis Edwin Hurd)	56
Hummingbirds, The (Juliette A. Owen).....	66
Hummingbird, The Anna's (Illustration).....	50
Hummingbird, The Birth of the (Poem) (Nelly Hart Woodworth).....	220
Hummingbird, The Rufous (Illustration)	59
Hummingbird, The (Poem) (Nelly Hart Woodworth).....	204
Hummingbird, The Rivoli (Illustration).....	201
Hummingbird, To a (Poem) (John Vance Cheney).....	49
Hyena, The Striped (Illustration) (John Ainslie).....	179
In the Hollow of His Hand (A Story of a Sparrow) (Ella F. Mosby).....	187
Jim Crow and His Cousins (Claudia May Ferrin).....	42
June (Poem) ("The Vision of Sir Launfal") (James Russell Lowell).....	1
Kinglet, Ruby-crowned (Juliette A. Owen)	102
Lion, The African (Illustration) (Dane Coolidge).....	131
Longing (Poem) (Lloyd Thompson)	54
Martyrs of the Woods (Poem) (George Klinge)	36

Mate, or Paraguay Tea (Anna Rosalie Henderson).....	24
Meadow, In the (Poem) (Sarah E. Sprague).....	80
Meadow Lark, To the (Poem) (J. Mayne Baltimore).....	174
Monkey, The Spider (Illustration) (John Ainslie).....	191
Monkey, The Rhesus (Illustration) (John Ainslie).....	225
Moose, The Alaskan (Illustration) (Dane Coolidge).....	134
Mullen, The (Illustration) (Charles S. Raddin).....	38
Neighboring with Nature (Sallie Margaret O'Malley).....	157
Nicodemus (A Story of a Pet Blackbird) (Belle Paxson Drury).....	175
November (Poem) (Walter Thornbury).....	192
November Conference, The Annual (Loveday Almira Nelson).....	149
October (Sonnet) (Helen Hunt Jackson).....	97
October Month, The Coming of Miss (Loveday Almira Nelson).....	108
Oriole (Poem—"Under the Willows") (James Russell Lowell).....	19
Oriole, Bullock's (Illustration) (Charles Bendire).....	2
Pansy Bed, A (Grace Marion Bryant).....	37
Paraguay Tea, or Mate (Anna Rosalie Henderson).....	24
Partners (A Story about Lichens) (Ella F. Mosby).....	12
Partridge, The Call of the (Poem) (Belle Hitchcock).....	41
Pigeons, Touching Incidents about (George Bancroft Griffith).....	89
Petrel, Song of the Stormy (Poem) (C. G. B.).....	188
Plant that Melts Ice, A (Louise Jamison).....	65
Poem (Selection from "Landscape") (Thomas Bailey Aldrich).....	157
Poem (Selection from "Landscape") (Thomas Bailey Aldrich).....	176
Poem (Selection from "'Round the Year") (G. Cooper).....	144
Poem (Selection from "'Round the Year") (G. Cooper).....	193
Poem (Selection) (May Riley Smith).....	13
Poem (Selection) (Walter Thornbury).....	97
Poem (Selection) (John Greenleaf Whittier).....	25
Poem (Selection from "The Lumberman") (John Greenleaf Whittier).....	164
Poem (Selection) (Wayne Whistler).....	137
Sanderling, The (Illustration).....	11
San Joaquin, On the (Charles Elmer Jenney).....	90
Shrike, The Great Northern (Illustration) (Edward Brayton Clark).....	14
Snow-Flake, A (Poem) (Thomas Bailey Aldrich).....	156
Snow-Flakes (Poem) (Henry Wadsworth Longfellow).....	193
Song Birds of the Southwest (Alberta A. Field).....	127
Southland, Off for the (Claudia May Ferrin).....	169
Sparrow, About a (H. S. Keller).....	61
Sparrow, The Chipping (Illustration).....	213
Sparrow Family, the (Narcissa Louis).....	113
Sparrow, The Field (Illustration).....	155
Sparrow, The Tree (Illustration).....	110
Sparrow, The White-throated (Illustration).....	62
Sparrow's Bedtime, The (Poem) (Adene Williams).....	113
Sparrow's Blunder, Mr. and Mrs. (Lee McCrae).....	115
Star Fish, The (Rest H. Metcalf).....	79
Tanager, The Rose (Juliette A. Owen).....	221
Thanksgiving by the Ninnescah (Mary McCrae Culter).....	161
Tiger, The Bengal (Illustration) (Dane Coolidge).....	95
Topaz (Illustration) (Oliver Cummings Farrington).....	216
Topsy (A Story of a Crow) (Martha R. Fitch).....	85
Tourmaline (Illustration) (Oliver Cummings Farrington).....	74
Tragedy of the Air (Poem) (George Klinge).....	168
Trouting Barefoot (Poem) (Belle A. Hitchcock).....	133
Turkey, The Indignant (Fannie Skelton Bissell).....	210
Turquoise (Illustration) (Oliver Cummings Farrington).....	170
Vireo, The White-eyed (Illustration).....	194
Vireo, The White-eyed (Poem) (Annie Wakely Jackson).....	197
Wrlrus, The (Illustration) (Dane Coolidge).....	86
Warbler, The Black-poll (Illustration).....	167
Warbler, The Black-throated Green (Illustration).....	119
Warbler, The Parula (Illustration).....	71
Warbler, The Worm-eating (Illustration).....	204
Weed Picture, A (Mary Noland).....	176
What a Little Mouse Said (Jessie Juliet Knox).....	60
Whippoorwills, The Reign of the (Poem) (Frank English).....	101
Window-Pane Reverie, A (Roselle Theodore Cross).....	116
Wren, The Carolina (Illustration).....	158
Zebra, The (Illustration) (John Ainslie).....	235

UNIVERSITY OF ILLINOIS-URBANA



3 0112 110950539